VOLUME 21 / NUMBER 16
AUGUST 23, 1983
ACC. NOS. N83-26784 TO N83-27949

Ast.
OCT 27 1983
ASTRONOMY
TL
501
S42
v.21
no16
ROOM USE ONLY
The University of Michigan Astronomy Library

STAR

AN ABSTRACT JOURNAL

Scientific and Technical Aerospace Reports

25th Anniversary
1958-1983

PRODUCED BY THE
SCIENTIFIC AND TECHNICAL
INFORMATION
BRANCH

NASA

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WHAT YOU CAN DO FOR *STAR*

All users of this abstract service are urged to forward reports to be considered for announcement in *STAR*. This will aid NASA in its efforts to provide the fullest possible coverage of all scientific and technical publications that might support aeronautics and space research and development. If you have prepared relevant reports (other than those that you will transmit to NASA, DoD, or DOE through the usual contract- or grant-reporting channels), please send them for consideration to the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

Reprints of journal articles, book chapters, and conference papers are also welcome. These will be considered for announcement in *STAR's* companion journal, *International Aerospace Abstracts*.

You may specify a particular source to be included in a report announcement if you wish; otherwise the report will be placed on public sale at the National Technical Information Service. Copyrighted publications will be announced but not distributed or sold.

PURCHASE OF *STAR*

The semimonthly issues are available postpaid on subscription and in single copy from the Superintendent of Documents, United States Government Printing Office, Washington, D.C. 20402, United States of America.

Semimonthly issues...

Annual subscription rates: $90.00 domestic; $112.00 foreign. Price per single copy: $4.75 domestic; $5.95 foreign.

Annual index issues...

Pricing based upon pagination.

Domestic subscription rates...

Apply to the United States, Canada, Mexico, and all Central and South American countries, except as noted below.

Foreign subscription rates...

Apply to Argentina, Brazil, French Guiana, Guyana, Surinam, Belize, and all other countries throughout the world.

Payment should be by check, money order, or document coupons, and must accompany order. Remittances from foreign countries should be made by international money order or draft on an American bank, payable to the Superintendent of Documents, or by UNESCO book coupons.

PUBLISHED BY:

UNITED STATES GOVERNMENT
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
SCIENTIFIC AND TECHNICAL INFORMATION BRANCH
Scientific and Technical Aerospace Reports, Volume 21, is prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by PRC Government Information Systems.

The Administrator of the National Aeronautics and Space Administration has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Agency. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through February 28, 1985.

US ISSN 0036-8741

INTRODUCTION

Scientific and Technical Aerospace Reports (STAR) is a major component of a comprehensive National Aeronautics and Space Administration information system covering aeronautics, space, and supporting disciplines. *STAR* is issued on the 8th and 23rd of each month and announces current publications of the following types:

- NASA, NASA contractor, and NASA grantee reports
- Reports issued by other U.S. Government agencies, domestic and foreign institutions, universities, and private firms
- Translations in report form
- NASA-owned patents and patent applications
- Dissertations and theses

Cumulative index volumes are published annually.

Journal, book, and conference literature, cover-to-cover journal translations, and certain foreign dissertations are announced in a companion journal, *International Aerospace Abstracts (IAA)*, available on subscription from the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

SUBJECT SCOPE

Subject scope of *STAR*, and *IAA* includes all aspects of aeronautics and space research and development, supporting basic and applied research, and applications. Aerospace aspects of earth resources, energy development, conservation, oceanography, environmental protection, urban transportation, and other topics of high national priority are also covered.

OTHER NASA PUBLICATIONS

Other NASA publications and information services are described in the publication, *The NASA Scientific and Technical Information System ... and How to Use It*, available without charge from the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

HOW TO USE *STAR* SUBJECT CATEGORIES

STAR is categorized by 10 major subject divisions divided into 74 specific subject categories and one general category/division. The major subject divisions are listed in the Table of Contents, together with a note for each that defines its scope and provides any cross-references. For example:

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

Each major division is further divided into as many as nine specific categories, which are identified by category numbers.

Abstracts in *STAR* are grouped by specific category, the categories appearing in sequential order. Category breaks in the abstract section are identified by the category number and title, and a scope note. Cross-references to other categories are provided as appropriate. For example:

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*.

CROSS-REFERENCES

Individual *STAR* abstracts are not ordinarily cross-referenced, except for certain conference reports or book translations that have had separate abstracts written for their component papers or chapters. Citations and abstracts of the components follow immediately after those of the parent document. When the subject content of a component differs sufficiently from the general content of the parent, a cross-reference citation also is printed at the end of the category to which it normally would have been assigned if it were independent.

DOCUMENTS ON MICROFICHE

Documents on microfiche(1) are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

AVAILABILITIES

One or more sources from which a document announced in *STAR* is available to the public is given in each citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size, containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26:1 reduction).

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code following the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, as indicated above, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Adminstration, Public Documents Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its' Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this Introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free. (See discussion of patents and patent applications below.)

NASA PATENTS AND PATENT APPLICATIONS

Patents and patent applications owned by NASA are announced in *STAR* under appropriate subject categories and are referenced in the *STAR* indexes. In the Report/Accession Number Index, patents are indexed by the NASA Case Number (which appears in lieu of the report number in other indexes), the U.S. Patent Number, the U.S. Patent Application Serial Number, and the U.S. Patent Class. Patent applications for which patents have not yet been issued are indexed by the NASA Case Number and the U.S. Patent Application Serial Number.

NASA *patent application specifications* are sold in paper copy by the National Technical Information Service at price code A02 ($7.00 domestic; $14.00 foreign). Microfiche are sold at price code A01 ($4.50 domestic; $9.00 foreign). The US-Patent-Appl-SN- number should be used in ordering either paper copy or microfiche from NTIS. Printed copies of *patents* (which are not microfiched) are available for purchase at 50 cents per copy from:

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

When ordering patents, the U.S. Patent Number should be used, and payment must be remitted in advance, preferably by money order or check payable to the Commissioner of Patents and Trademarks. Prepaid purchase coupons for ordering are also available from the Patent and Trademark Office. The patents and patent applications announced in *STAR* are owned by NASA and are available for royalty-free licensing. Requests for licensing terms and further information should be addressed to:

Assistant General Counsel for Patent Matters/Code GP-1
National Aeronautics and Space Administration
Washington, D.C. 20546

ELIGIBILITY AND REGISTRATION FOR NASA INFORMATION PRODUCTS AND SERVICES

A variety of services is available to organizations of the following types that have registered with NASA to receive specific services or products:

1. NASA offices, research centers, contractors, subcontractors, grantees, and consultants;
2. Other U.S. Government agencies and their contractors;
3. Libraries in the United States that have arrangements with NASA to maintain collections of NASA documents for public reference;
4. Other organizations in the United States having a need for NASA documents in work related to aeronautics and space research;
5. Organizations abroad that have established reciprocal document exchange arrangements with NASA.

Only the central service points or central points of document acquisition and control within qualified organizations are eligible to register for NASA products and services. Domestic organizations that may be eligible to receive various classes of NASA publications and services should address their requests for registration or for further information to:

NASA Scientific and Technical Information Facility
ATTN: Registration Activity
P.O. Box 8757
B.W.I. Airport, Maryland 21240

Organizations abroad should direct requests to the same address, but to the attention of: International Exchange Program.

AVAILABILITY OF *STAR* ABSTRACTS ON MICROFICHE

Microfiche of the abstract sections of this issue and other issues of *STAR* are available on annual subscription from NTIS, Attn: Subscriptions, 5285 Port Royal Road, Springfield, Virginia 22161. Annual subscription rates are $60.00 North America; $120.00 foreign. Abstract sections for previous years retroactive to 1964 are available at the current rates. Microfiche for individual *STAR* issue abstract sections are not available.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

Fachinformationszentrum Energie, Physik, Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space Administration
Scientific and Technical Information Branch (NIT-41)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey Library
National Center – MS 950
12201 Sunrise Valley Drive
Reston, Virginia 22092

U.S. Geological Survey Library
2255 North Gemini Drive
Flagstaff, Arizona 86001

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey Library
Box 25046
Denver Federal Center, MS 914
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1983)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.50	$ 9.00
A02	001-025	7.00	14.00
A03	026-050	8.50	17.00
A04	051-075	10.00	20.00
A05	076-100	11.50	23.00
A06	101-125	13.00	26.00
A07	126-150	14.50	29.00
A08	151-175	16.00	32.00
A09	176-200	17.50	35.00
A10	201-225	19.00	38.00
A11	226-250	20.50	41.00
A12	251-275	22.00	44.00
A13	276-300	23.50	47.00
A14	301-325	25.00	50.00
A15	326-350	26.50	53.00
A16	351-375	28.00	56.00
A17	376-400	29.50	59.00
A18	401-425	31.00	62.00
A19	426-450	32.50	65.00
A20	451-475	34.00	68.00
A21	476-500	35.50	71.00
A22	501-525	37.00	74.00
A23	526-550	38.50	77.00
A24	551-575	40.00	80.00
A25	576-600	41.50	83.00
A99	601-up	-1	-2

1/ Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up.

2/ Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more.

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.50
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.50
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	88.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50
E-99 - Write for quote		
N01	35.00	45.00

VOLUME 21 NUMBER 16/AUGUST 23, 1983

TABLE OF CONTENTS

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics.*

01 AERONAUTICS (GENERAL) 2509

02 AERODYNAMICS 2513

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*

03 AIR TRANSPORTATION AND SAFETY 2516

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION 2516

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command and Tracking* and *32 Communications.*

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE 2516

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

06 AIRCRAFT INSTRUMENTATION N.A.

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

07 AIRCRAFT PROPULSION AND POWER 2518

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

08 AIRCRAFT STABILITY AND CONTROL 2519

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

09 RESEARCH AND SUPPORT FACILITIES (AIR) 2520

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

ASTRONAUTICS

Includes astronautics (general); astrodynamics; ground support systems and facilities (space); launch vehicles and space vehicles; space transportation; spacecraft communications, command and tracking; spacecraft design, testing and performance; spacecraft instrumentation; and spacecraft propulsion and power.

For related information see also *Aeronautics*

12 ASTRONAUTICS (GENERAL) 2520

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

13 ASTRODYNAMICS 2520

Includes powered and free-flight trajectories; and orbit and launching dynamics.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE) N.A.

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research and Support Facilities (Air).*

15 LAUNCH VEHICLES AND SPACE VEHICLES 2521

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

16 SPACE TRANSPORTATION 2526

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

17 SPACECRAFT COMMUNICATION, COMMAND AND TRACKING 2529

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE 2529

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

19 SPACECRAFT INSTRUMENTATION N.A.

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

20 SPACECRAFT PROPULSION AND POWER 2530

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

CHEMISTRY AND MATERIALS

Includes chemistry and materials (general); composite materials; inorganic and physical chemistry; metallic materials; nonmetallic materials; and propellants and fuels.

23 CHEMISTRY AND MATERIALS (GENERAL) **N.A.**
Includes biochemistry and organic chemistry.

24 COMPOSITE MATERIALS **2531**
Includes laminates.

25 INORGANIC AND PHYSICAL CHEMISTRY **2532**
Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.
For related information see also *77 Thermodynamics and Statistical Physics.*

26 METALLIC MATERIALS **2540**
Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

27 NONMETALLIC MATERIALS **2544**
Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

28 PROPELLANTS AND FUELS **2547**
Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

ENGINEERING

Includes engineering (general); communications; electronics and electrical engineering; fluid mechanics and heat transfer; instrumentation and photography; lasers and masers; mechanical engineering; quality assurance and reliability; and structural mechanics.
For related information see also *Physics.*

31 ENGINEERING (GENERAL) **2551**
Includes vacuum technology; control engineering; display engineering; and cryogenics.

32 COMMUNICATIONS **2555**
Includes land and global communications; communications theory; and optical communications.
For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

33 ELECTRONICS AND ELECTRICAL ENGINEERING **2561**
Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuity.
For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

34 FLUID MECHANICS AND HEAT TRANSFER **2564**
Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.
For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

35 INSTRUMENTATION AND PHOTOGRAPHY **2571**
Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.
For aerial photography see *43 Earth Resources.* For related information see also *06 Aircraft Instrumentation* and *19 Spacecraft Instrumentation.*

36 LASERS AND MASERS **2573**
Includes parametric amplifiers.

37 MECHANICAL ENGINEERING **2575**
Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

38 QUALITY ASSURANCE AND RELIABILITY **2580**
Includes product sampling procedures and techniques; and quality control.

39 STRUCTURAL MECHANICS **2581**
Includes structural element design and weight analysis; fatigue; and thermal stress.
For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

GEOSCIENCES

Includes geosciences (general); earth resources; energy production and conversion; environment pollution; geophysics; meteorology and climatology; and oceanography.
For related information see also *Space Sciences.*

42 GEOSCIENCES (GENERAL) **N.A.**

43 EARTH RESOURCES **2585**
Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.
For instrumentation see *35 Instrumentation and Photography.*

44 ENERGY PRODUCTION AND CONVERSION **2595**
Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

45 ENVIRONMENT POLLUTION **2613**
Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

46 GEOPHYSICS **2618**
Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.
For space radiation see *93 Space Radiation.*

47 METEOROLOGY AND CLIMATOLOGY **2621**
Includes weather forecasting and modification.

48 OCEANOGRAPHY **2624**
Includes biological, dynamic and physical oceanography; and marine resources.

LIFE SCIENCES

Includes sciences (general); aerospace medicine; behavioral sciences; man/system technology and life support; and planetary biology.

51 LIFE SCIENCES (GENERAL) **2626**
Includes genetics.

52 AEROSPACE MEDICINE **2627**
Includes physiological factors; biological effects of radiation; and weightlessness.

53 BEHAVIORAL SCIENCES **2629**
Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT **2631**
Includes human engineering; biotechnology; and space suits and protective clothing.

55 PLANETARY BIOLOGY **N.A.**
Includes exobiology; and extraterrestrial life.

MATHEMATICAL AND COMPUTER SCIENCES

Includes mathematical and computer sciences (general); computer operations and hardware; computer programming and software; computer systems; cybernetics; numerical analysis; statistics and probability; systems analysis; and theoretical mathematics.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL) **N.A.**

60 COMPUTER OPERATIONS AND HARDWARE **2632**
Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

61 COMPUTER PROGRAMMING AND SOFTWARE **2633**
Includes computer programs, routines, and algorithms.

62 COMPUTER SYSTEMS **2637**
Includes computer networks.

63 CYBERNETICS **2637**
Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support.*

64 NUMERICAL ANALYSIS **2637**
Includes iteration, difference equations, and numerical approximation.

65 STATISTICS AND PROBABILITY **2643**
Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

66 SYSTEMS ANALYSIS **2645**
Includes mathematical modeling; network analysis; and operations research.

67 THEORETICAL MATHEMATICS **2646**
Includes topology and number theory.

PHYSICS

Includes physics (general); acoustics; atomic and molecular physics; nuclear and high-energy physics; optics; plasma physics; solid-state physics; and thermodynamics and statistical physics.
For related information see also *Engineering.*

70 PHYSICS (GENERAL) **2646**
For geophysics see *46 Geophysics.* For astrophysics see *90 Astrophysics.* For solar physics see *92 Solar Physics.*

71 ACOUSTICS **2658**
Includes sound generation, transmission, and attenuation.
For noise pollution see *45 Environment Pollution.*

72 ATOMIC AND MOLECULAR PHYSICS **2661**
Includes atomic structure and molecular spectra.

73 NUCLEAR AND HIGH-ENERGY PHYSICS **2668**
Includes elementary and nuclear particles; and reactor theory.
For space radiation see *93 Space Radiation.*

74 OPTICS **2669**
Includes light phenomena.

75 PLASMA PHYSICS **2670**
Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics.* For space plasmas see *90 Astrophysics.*

76 SOLID-STATE PHYSICS **2674**
Includes superconductivity.
For related information see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

77 THERMODYNAMICS AND STATISTICAL PHYSICS **2677**
Includes quantum mechanics; and Bose and Fermi statistics.
For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

SOCIAL SCIENCES

Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law and political science; and urban technology and transportation.

80 SOCIAL SCIENCES (GENERAL) **N.A.**
Includes educational matters.

81 ADMINISTRATION AND MANAGEMENT **2678**
Includes management planning and research.

82 DOCUMENTATION AND INFORMATION SCIENCE **2679**
Includes information storage and retrieval technology; micrography; and library science.
For computer documentation see *61 Computer Programming and Software.*

83 ECONOMICS AND COST ANALYSIS **N.A.**
Includes cost effectiveness studies.

84 LAW AND POLITICAL SCIENCE **2681**
Includes space law; international law; international cooperation; and patent policy.

85 URBAN TECHNOLOGY AND TRANSPORTATION **2682**
Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.
For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.
For related information see also *Geosciences.*

88 SPACE SCIENCES (GENERAL) **2683**

89 ASTRONOMY **2684**
Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS **2685**
Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION **2686**
Includes planetology; and manned and unmanned flights.
For spacecraft design see *18 Spacecraft Design, Testing and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

92 SOLAR PHYSICS **2686**
Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION **N.A.**
Includes cosmic radiation; and inner and outer earth's radiation belts.
For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

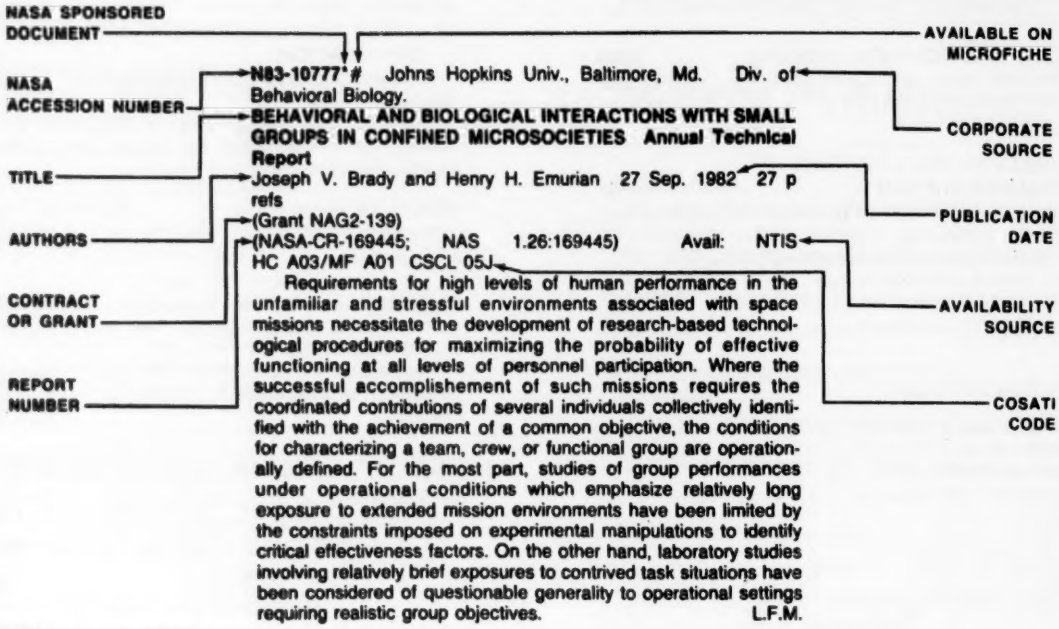
GENERAL

99 GENERAL **N.A.**

Note: N.A. means that no abstracts were assigned to this category for this issue.

SUBJECT INDEX **I-1**
PERSONAL AUTHOR INDEX **I-67**
CORPORATE SOURCE INDEX **I-77**
CONTRACT NUMBER INDEX **I-93**
REPORT/ACCESSION NUMBER INDEX **I-97**

TYPICAL CITATION AND ABSTRACT


NASA SPONSORED DOCUMENT
AVAILABLE ON MICROFICHE
NASA ACCESSION NUMBER
N83-10777*# Johns Hopkins Univ., Baltimore, Md. Div. of Behavioral Biology.
CORPORATE SOURCE
TITLE
BEHAVIORAL AND BIOLOGICAL INTERACTIONS WITH SMALL GROUPS IN CONFINED MICROSOCIETIES Annual Technical Report
AUTHORS
Joseph V. Brady and Henry H. Emurian 27 Sep. 1982 27 p refs
PUBLICATION DATE
CONTRACT OR GRANT
(Grant NAG2-139)
REPORT NUMBER
(NASA-CR-169445; NAS 1.26:169445) Avail: NTIS HC A03/MF A01 CSCL 05J
AVAILABILITY SOURCE
COSATI CODE
Requirements for high levels of human performance in the unfamiliar and stressful environments associated with space missions necessitate the development of research-based technological procedures for maximizing the probability of effective functioning at all levels of personnel participation. Where the successful accomplishement of such missions requires the coordinated contributions of several individuals collectively identified with the achievement of a common objective, the conditions for characterizing a team, crew, or functional group are operationally defined. For the most part, studies of group performances under operational conditions which emphasize relatively long exposure to extended mission environments have been limited by the constraints imposed on experimental manipulations to identify critical effectiveness factors. On the other hand, laboratory studies involving relatively brief exposures to contrived task situations have been considered of questionable generality to operational settings requiring realistic group objectives. L.F.M.

VOLUME 21 NUMBER 16/AUGUST 23, 1983

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N83-26784* National Aeronautics and Space Administration, Washington, D. C.
AERONAUTICAL ENGINEERING: A CONTINUING BIBLIOGRAPHY, 1982 CUMULATIVE INDEX
Jan. 1983 750 p
(NASA-SP-7037(157); NAS 1.21:7037(157)) Avail: NTIS HC $10.00 CSCL 01A

This bibliography is a cumulative index to the abstracts contained in NASA SP-7037 (145) through NASA SP-7037 (156) of Aeronautical Engineering: A Continuing Bibliography. NASA SP-7037 and its supplements have been compiled through the cooperative efforts of the American Institute of Aeronautics and Astronautics (AIAA) and the National Aeronautics and Space Administration (NASA). This cumulative index includes subject, personal author, corporate source, contract, and report number indexes. Author

N83-26785*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SOME HISTORICAL TRENDS IN THE RESEARCH AND DEVELOPMENT OF AIRCRAFT
M. Leroy Spearman Apr. 1983 15 p
(NASA-TM-84665; NAS 1.15:84665) Avail: NTIS HC A02/MF A01 CSCL 01B

A survey of some trends in aircraft design was made in an effort to determine the relation between research, development, test, and evaluation (RDT and E) and aircraft mission capability, requirements, and objectives. Driving forces in the history of aircraft include the quest for speed which involved design concepts incorporating jet propulsion systems and low drag features. The study of high speed design concepts promoted new experimental and analytical research techniques. These research techniques, in turn, have lead to concepts offering new performance potential. Design trends were directed toward increased speed, efficiency, productivity, and safety. Generally speaking, the research and development effort has been evolutionary in nature and, with the exception of the transition to supersonic flight, little has occurred since the origin of flight that has drastically changed the basic design fundamentals of aircraft. However, this does not preclude the possibility of dramatic changes in the future since the products of research are frequently unpredictable. Advances should be expected and sought in improved aerodynamics (reduced drag, enhanced lift, flow field exploitation); propulsion (improved engine cycles, multimode engines, alternate fuels, alternate power sources); structures (new materials, manufacturing techniques); all with a view toward increased efficiency and utility. Author

N83-26786# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
AGARD BULLETIN: MEETINGS, PUBLICATIONS, MEMBERSHIP
Jan. 1983 77 p
(AGARD-BUL-83/1) Avail: NTIS HC A05/MF A01

Information on all the planned meetings including dates, locations and brief descriptions of their themes is included. Included also is a list of all publications which were issued together with their abstracts. Complete listings of all publications which appeared since the founding of this agency are included in the index of publications. Information on how AGARD documents may be obtained is also given. S.L.

N83-26787# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
A COLLECTION OF PAPERS IN THE AEROSPACE SCIENCES Final Report, Dec. 1978 - Nov. 1979
K. S. Nagaraja, ed. and James S. Petty, ed. Jun. 1982 660 p refs
(AD-A122667; AFAPL-TR-79-2126) Avail: NTIS HC A99/MF A01 CSCL 01/1

A collection of thirty-five papers covering a range of topics in the aerospace sciences, including propulsion, fluid dynamics, aerodynamics, energy conversion, and mathematical analysis is presented. The introductory paper is a biography of Dr. Hans von Ohain, a pioneer in the development of the aircraft jet engine. For individual titles, see N83-26788 through N83-26813.

N83-26788# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
ELECTROFLUID DYNAMICS: THE ROLE OF HANS VON OHAIN Final Report **c34**
Frank Wattendorf *In its* A Collection of Papers in the Aerospace Sci. Jun. 1982 p 68-82 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 20/4

The progress in electrofluid dynamics was reviewed, with emphasis on the following areas: analysis of basic phenomenon; identification of components, parametric studies, development of scaling laws, optimization studies of components, optimization of systems with respect to selective goals, verification experiments, and exploratory research. Author

N83-26789# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
THE ENERGY BALANCE IN AXISYMMETRIC STEADY COMPRESSIBLE SWIRL FLOWS WITH CLOSED STREAMLINES Final Report **c34**
K. G. Guderley *In its* A Collection of Papers in the Aerospace Sci. Jun. 1982 p 116-136 ref (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 20/4

The core flow in axisymmetric steady compressible swirl flows with closed streamlines at high Reynolds numbers are computed from equations in which the viscosity and the heat conductivity terms are omitted. Viscosity and heat conductivity, nevertheless, play a decisive role; one must postulate that their long time effects vanish. In a flow, free of viscosity and heat conductivity, there exist certain quantities which are constant along the streamlines,

namely the moment of momentum of the particles with respect to the axis of symmetry, the entropy and the total energy (that is the constant in Bernoulli's equation). In general, these quantities are not the same for all streamlines. If these functions are not properly chosen, then certain expressions (computed from the inviscid flow field) which are interpreted as the longtime effects of heat conductivity and viscosity, are different from zero. Examples computed on this basis are analyzed from a thermodynamic point of view. Author

N83-26790# Pratt and Whitney Aircraft, East Hartford, Conn. Dept. of Analytical Engineering.
COMPOUND-COMPRESSIBLE NOZZLE FLOW Final Report c34
A. Bernstein, C. Hevenor, and W. H. Heiser (General Electric Co.) *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 137-144 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 20/4

A one dimensional theory based upon fundamental flow relationships is presented for analyzing the behavior of one or more gas streams flowing through a single nozzle. This compound compressible flow theory shows that the behavior of each stream is influenced by the presence of the other streams. The behavior of compound compressible flow is predicted by determining how changing conditions at the nozzle exit plane affect conditions within the nozzle. When choking of the compound compressible flow nozzle occurs, an interesting phenomenon exists. The compound compressible flow is shown to be choked at the nozzle throat, although the individual stream Mach numbers there are not equal to one. This phenomenon is verified by a wave analysis which shows that, when choking occurs, a pressure wave cannot be propagated upstream to the nozzle throat even though some of the individual streams have Mach numbers less than one. Algebraic methods based on this compound compressible flow theory are used to demonstrate the usefulness of this approach in computing the behavior of compound-compressible flow nozzles. Author

N83-26791# Air Force Aero Propulsion Lab., Wright-Patterson AFB, Ohio. Ramjet Technology Branch.
COAXIAL DUMP COMBUSTOR INVESTIGATIONS Final Report c07
R. R. Craig, J. E. Drewry, and F. D. Stull *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 145-156 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 21/5

An experimental investigation was conducted involving coaxial dump combustors with two different types of flameholders (annular and Y) installed at the dump station in an attempt to correlate combustor performance with previous nonreacting flowfield results. Flameholder blockage, combustor length, exit area ratio, inlet temperature, and chamber pressure were varied for both wall injection and premixed fuel conditions. Lean blowout limits, combustion efficiency, combustor total pressure drop, and wall static pressure distributions were obtained from these runs using JP-4 fuel. In addition, a limited amount of surface heating patterns and combustion oscillation data were obtained. Author

N83-26792# Arizona Univ., Tucson. Dept. of Aerospace and Mechanical Engineering.
A NOTE ON ADAPTIVE WIND TUNNELS WITH IMPERFECT CONTROL Final Report c09
William R. Sears *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 191-207 refs (For primary document see N83-26787 16-01)
(Grant AF-AFOSR-2954E-76)
Avail: NTIS HC A99/MF A01 CSCL 14/2

An earlier study of the convergence of the adaptive wall wind tunnel scheme for a sinusoidal model in a two dimensional tunnel is extended to the case where ideal matching at the interface cannot be achieved. It is assumed that, in place of the desired sinusoidal correction, a correction including an extraneous harmonic always occurs. Two different assumptions are made regarding the fitting of this distorted sinusoid to the observed error signal. The iteration converges for the same range of relaxation constants as for the ideal case, but that unconfined flow is not achieved. For reasonable numerical values, the iteration nevertheless appears to make substantial improvement in a flow involving boundary interference. Author

N83-26793# Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio.
THE NUMERICAL SOLUTION OF PRESSURE OSCILLATIONS IN AN OPEN CAVITY Final Report c34
W. L. Hankey and J. S. Shang *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 208-242 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 20/4

Open cavities on aircraft exposed to high speed flow, such as bomb bays can give rise to intense self-induced pressure oscillations. The amplitude of these oscillations, under certain flight conditions, can cause structural damage. Substantial experimental and analytical efforts have investigated these pressure fluctuations, resulting in some understanding of the complex interaction of the external shear layer and cavity acoustical disturbances. However, no numerical computations were obtained for the complete governing fluid mechanical equations. Numerical solutions of the Navier-Stokes equations for an open cavity in order to provide a new tool for the analysis of this phenomenon are studied. Author

N83-26794# Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio.
BOUNDARY-LAYER TRANSITION ON BLUNT, SLENDER CONES AT HYPERSONIC MACH NUMBERS Final Report c02
Kenneth F. Stetson *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 243-292 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 01/1

New wind tunnel data was obtained to investigate the effects of tip bluntness and angle of attack on boundary layer transition on slender cones. The rearward displacement of transition due to tip bluntness and the maximum displacement of transition are reasonably well understood and explainable primarily on the basis of a reduction in local Reynolds number due to pressure losses across the bow shock. The rapid forward movement of transition observed on the cone frustum is a mystery and will be studied further in future experiments. The observed rapid movement of transition from the sphere cone tangency point to the subsonic region of the tip is compatible with stability analysis. The transition movements obtained on the sharp cone at angle of attack were compatible with both theory and experiment. The movement of transition on blunt cones at angle of attack remains poorly understood. Author

N83-26795# Institute for Defense Analyses, Arlington, Va.
A NOTE ON THE OSCILLATION OF CAVITIES COUPLED TO AERODYNAMIC FLOWS Final Report c02
Alexander H. Flax *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 293-318 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 01/1

The extensive recent literature on the oscillation of cavities interacting with aerodynamic flows has resulted in a bewildering array of models for frequency prediction, each of which has theoretical or experimental bases for various of the physical processes being modeled to describe the overall system. Such models were generally built on various representations of two physical phenomena and their interaction: the instability of vortex sheets between fluid layers of differing velocities and the acoustic resonance of cavities. Surprisingly, most of the models fit at least some set of experimental data amazingly well, especially in view of the complex interacting physical phenomena with which they deal. Almost all of the models are rationalized within the phenomenological framework of a formula due to Rossiter. However, in this contex it seems that what this subject has evolved into is a mathematical theory of integral wavelengths. Author

N83-26796# Maryland Univ., College Park. Dept. of Aerospace Engineering.
COMPUTATIONAL FLUID DYNAMICS: AN ENGINEERING TOOL? Final Report **c34**
John D. Anderson, Jr. *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 325-336 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 20D

Computational fluid dynamics in general, and time dependent finite difference techniques in particular, are examined from the point of view of direct engineering applications. Examples are given of the supersonic blunt body problem and gasdynamic laser calculations, where such techniques are clearly engineering tools. In addition, Navier-Stokes calculations of chemical laser flows are discussed as an example of a near engineering tool. Finally, calculations of the flowfield in a reciprocating internal combustion engine are offered as a promising future engineering application of computational fluid dynamics. Author

N83-26797# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Thermomechanics Branch.
CONSTANT PARAMETER TWO COMPONENT CHANNEL FLOWS Final Report **c02**
Kenneth R. Cramer *In its* A Collection of Papers in the Aerospace Sci. Jun. 1982 p 337-357 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 01/1

The Re-entry Heating Energies Analyzer (RHEA) concept for accelerating air to velocities significantly greater than that produced by expanding heated air from a reservoir. The RHEA process employs a low molecular weight gas to accelerate a dense particle cloud to very high velocities which is then separated and introduced into an expanded air stream which is then further accelerated by the drag of the particle cloud. The air is cleaned prior to its entry into the wind tunnel test section. Constant parameter two component channel flows as a basis for designing the air acceleration section were examined. Results demonstrate that a constant static air temperature channel would be a useful choice for producing high Mach number, high recovery pressure flows for testing reentry missile nose tips. Author

N83-26798# Air Force Aero Propulsion Lab., Wright-Patterson AFB, Ohio. Turbine Engine Div.
THE USE OF VORTEX GENERATORS AS INEXPENSIVE COMPRESSOR CASING TREATMENT Final Report **c07**
C. Herbert Law, Arthur J. Wennerstrom, and William A. Buzzell *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 358-371 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 20/5

This paper describes an inexpensive form of casing treatment which was found to increase both efficiency and stall margin in an axial compressor stage and which could be easily and cheaply retrofitted to existing engines. The method consists of placement of a row of vortex generators on the outer casing of an axial compressor, upstream of the rotor. Design techniques are described. An experimental investigation is also described in which vortex generator tip treatment was applied to a single stage axial compressor. Gains in compressor and stall margin were observed. Author

N83-26799# Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio. Aeronautical Systems Div.
DEGRADATION OF A LASER BEAM BY A TURBULENT JET Final Report **c36**
G. F. Cudahy, J. T. VanKuren, and H. E. Wright *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 372-394 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 20/5

A laser beam traversing turbulence undergoes an intensity reduction which is correlated with the statistical behavior of refractive index perturbations. The analytical relation predicts degradation as a function of beam diameter, path length, wave number and wave structure function. Refractive index perturbations are approximated via the equations of state, using temperature and velocity perturbations. An experiment was conducted in which visible wavelength lasers traversed a well documented two dimensional jet. Temperature perturbations vary from 0.25 to 1.89 K and velocity fluctuations range from 9.2 to 30.8 m/sec. Measured central spot intensities are as low as 18% of the undisturbed beam, depending on jet Mach number, beam position relative to the jet exit and wavelength. The average difference between theory and experiment is two percent in terms of far field intensity. Author

N83-26800# Indian Inst. of Science, Bangalore.
ON THE LARGE SCALE STRUCTURE OF TURBULENCE IN BOUNDARY LAYER AND SHEAR FLOWS **c34**
M. A. Badri Narayanan *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 395-415 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 20/4

The basic understanding of the physics of turbulence has undergone many radical changes in the last few years. Turbulent fluctuations which were considered to be purely random in nature is no more accepted to behave in that fashion but made up of somewhat coherent and orderly structures mixed with noise like random disturbances. The major difficulty experienced in the experimental investigations is the identification of these coherent structures from the overall signal. New methods are being developed to identify them. These orderly motions are large in scale and seem to play an important role in the dynamics of the mixing and the transport processes which are the essential features of turbulence. In this paper the properties of the large scale fluctuations in boundary layers as well as in shear flows are discussed. Author

N83-26801# Aerospace Research Labs., Wright-Patterson AFB, Ohio.
IMPROVED ANALYTICAL AND NUMERICAL TECHNIQUES FOR CALCULATING EXPLOSIONS AND IMPLOSIONS Final Report **c34**
John W. Goresh and Henry E. Fettis *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 416-447 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 20/4

Theoretical investigations in connection with the hypervelocity launcher research efforts carried on at the Fluid Dynamics Facilities Research Laboratory have required a detailed study of strong explosions and implosions. In the case of an exploding blast wave, the similarity transformation can be explicitly determined by consideration of the principle of energy conservation. The resulting system of equations which ultimately contains only one parameter, namely the adiabatic constant, y, can then be integrated numerically, using the known relations at the shock front as initial conditions. Alternatively, known analytic solutions are available, but these have not been used extensively since they are implicit and do not allow the direct determination of the desired physical quantities (pressure, density, and velocity) at a given point. On the other hand, the numerical approach is time-consuming and also results in inaccuracies in the vicinity of the center. As a means of circumventing the above difficulties, the exact analytical solutions have been cast into a form which permits an iterative determination of all of the physical quantities directly as functions of position. B.W.

N83-26802# Florida Univ., Gainesville. Dept. of Engineering Sciences.
ON SYNGE'S CRITERION FOR THE STABILITY OF PLANE COUETTE FLOW Final Report **c34**
K. F. Lee and Knox Millsaps *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 448-455 (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01

A simple proof for the conjectured hydrodynamical stability of plane Couette flows against perturbations of all frequencies and of infinitesmal amplitude is one of the classically formulated

problems in theoretical fluid dynamics, and its solution has eluded everyone including many of the most powerful mathematical analysts of modern times. J. L. Synge made one of the most appealing approaches to the solution by giving a simple criterion for the lower bound of the minimally critical Reynolds Number. Synge's criterion was thought to be relatively weak although the limit of applicability has not been reported, and this investigation examines exactly the weakness by determining the extremum in terms of the maximum Reynolds Number, Rm, for stability. It is shown that R sub m = 4 is the maximum using Synge's criterion which is unfortunately less than R sub m = 44.3 using a much more complicated analysis due to Orr. B.W.

N83-26803# Flight Dynamics Research Corp., Van Nuys, Calif.
MIXING OF COMPRESSIBLE FLUID WITH APPLICATION TO EJECTOR THRUSTERS Final Report c02
Morton Alperin and Jiunn-Jenq Wu *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 456-477 ref (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 01/1

Mixing of two streams of compressible fluid having arbitrary properties at the start of mixing results in one of two possible states upon conclusion of the mixing process. These two final states can be differentiated by the fact that the Mach Number of the fully mixed flows are related in the same manner as are the Mach Numbers across a normal shock wave. One of these states is always representative of a subsonic flow and the other a supersonic flow. Since both solutions represent flows which satisfy the laws of mass flow and energy conservation and the momentum theorum in a channel of uniform cross-section, the physical possibility of achieving these end states must be corroborated by examination of the process in terms of the Second Law of Thermodynamics. Therefore the total energy change of the flows from the initial to the final state have been determined. It is shown that both solutions correspond to flows which have a positive entropy change in certain ranges of the initial conditions while in other ranges the solution corresponding to a supersonic end state may violate the Second Law of Thermodynamics. B.W.

N83-26804# Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio.
HIGHLIGHTS OF AN EJECTOR ANALYSIS Final Report c34
Siegfried Hasinger *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 478-488 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 20/4

Ejectors are fluid energy transfer devices which rely on direct fluid momentum exchange in a mixing process. This direct exchange is responsible for the mechanical simplicity of ejector devices. This simplicity is, however, not shared by the analysis of these devices. The great number of variables which are of interest for ejector operations lead to considerable functional complexities. In addition the influence of some of the variables on the ejector performance can be extremely sensitive. These conditions make an intuitive estimate of ejector performances in many cases impossible. The direct momentum exchange process allows, however, the establishment of a very reliable fluid dynamic picture as a basis for the analysis. Details of the mixing process do not enter the analysis and mixing can be treated as a completely independent problem. The simplifying assumption of one dimensional flow has an inherent validity for the fluid momentum considerations. By overcoming the functional difficulties of the analysis very realistic performance predictions can be made for a great variety of operating conditions including those which provide optimum ejector layouts. Author

N83-26805# Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio.
ADVANCES IN EJECTOR TECHNOLOGY: A TRIBUTE TO HANS VON OHAIN'S VISION Final Report c34
K. S. Nagaraja *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 489-517 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 20/4

A brief review of the significant accomplishments made at ARL in the basic understanding of the aerothermo fluid dynamic characteristics of ejectors is given. The studies of AFFDL which further enhanced the state-of-the-art of the ejectors for V/STOL applications are also indicated. The spectrum of activities in the Air Force not only gave a great deal of insight into the characteristics of the ejector flows, but also resulted in the development of compact ejectors that are relevant foor aircraft application. The saga of ejector investigations is continuing and it is within the realm of possibility that ejector systems will be successfully applied for a variety of aircraft operations in the coming years. B.W.

N83-26806# Air Force Aero Propulsion Lab., Wright-Patterson AFB, Ohio. Turbine Engine Div.
A ONE-DIMENSIONAL PROCEDURE FOR ESTIMATING THE PERFORMANCE OF EJECTOR NOZZLES Final Report c07
Kervyn D. Mach *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 540-555 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 21/5

A review of compound compressible flow theory is given. It is shown how the choked mass flow and thereby, the ejector pumping capacity are found. Analysis of unchoked operation is described and thrust equations for choked and unchoked operation are derived. The prediction of mixed flow performance for both constant pressure and constant area mixing is discussed. R.J.F.

N83-26807# Washington Univ., Seattle.
EFFECTS OF NON-CONSTANT ENTHALPY ADDITION ON FAN-NOZZLE COMBINATIONS Final Report c07
Gordon C. Oates and Walter M. Persz, Jr. (Pratt and Whitney Aircraft Group) *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 556-566 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 21/5

In order to estimate the expected effect on the thrust of the flow non-uniformities, two limiting cases are herein considered. An engine with non-constant enthalpy addition across the fan stage, but with otherwise perfect components is considered. The flow is then taken to be (1) a completely unmixed (isentropic), and (2) fully mixed in an ideal (no sidewall friction) constant area mixer prior to expansion through the nozzle. In each case the resulting net thrust is compared to that which would exist if the same total enthalpy addition to the fluid stream was supplied uniformly. R.J.F.

N83-26808# Wright State Univ., Dayton, Ohio.
SOME ADVANTAGES OF UNSTEADY AERODYNAMICS Final Report c02
Hermann Viets *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 567-585 refs (For primary document see N83-26787 16-01)
(Grant AF-AFOSR-3525-78)
Avail: NTIS HC A99/MF A01 CSCL 01/1

Several recent and ongoing experiments which involve the attempt to improve performance by utilizing unsteady flow are discussed. Two areas are described. The first is the introduction of unsteadiness into a boundary layer by mechanical means. The aim is to energize the boundary layer to avoid or lessen problems resulting from separation. A second area is the attempt to increase the mixing rate of jets by fluidically produced unsteadiness. The time dependency can be completely fluidically produced or it can be driven by a mechanical-fluidic interface. R.J.F.

N83-26809# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
THE BOJARSKI-LEWIS IDENTIFY FOR ELASTIC WAVE SCATTERING Final Report c32
D. A. Lee *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 586-597 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 20/14

It is shown that an extension of the Bojarski-Lewis identity does indeed hold for elastic wave scattering. Ways of applying

this result in non-destructive testing are discussed. It is argued that knowledge of the far-field limit of the physical elastodynamics approximation to the dilatation waves back-scattered from plane dilatation waves incident on a convex void in a homogeneous, isotropic, linearly elastic material, is equivalent to knowledge of the Fourier transform of the void's characteristic function. R.J.F.

N83-26810# Air Force Aero Propulsion Lab., Wright-Patterson AFB, Ohio.
THERMAL DISSOCIATION OF DIATOMIC MOLECULES Final Report c72
W. F. Bailey and A. Garscadden *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 634-641 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 20/8

A discrete collisional theory of dissociation under equilibrium and nonequilibrium conditions using a quantum kinetic approach to molecular energy transfer was investigated. The kinetic equations for molecular dissociation in a pure diatomic gas and diatomic gases in the presence of an inert diluent were formulated and solved. The incubation time was calculated and exhibited good agreement with experimental measurements. An analytic steady state form for the vibrational population and dissociation rate was developed which agreed with the time-dependent calculations. It was determined that rotational states play a significant role in the dissociation process and that the standard ladder model is inadequate. When rotational effects are properly included in the analysis, good agreement with experimental data is obtained. Author

N83-26811# Air Force Aero Propulsion Lab., Wright-Patterson AFB, Ohio.
VIBRATION ANALYSIS OF A SPINNING DISK USING IMAGE DEROTATED HOLOGRAPHIC INTERFEROMETRY Final Report c35
J. C. MacBain, J. E. Horner, W. A. Stange, and J. S. Ogg (Air Force Aeronautical Systems Div.) *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 642-647 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 14/5

The application of image derotated holographic interferometry to study the resonant response of a rotating steel disk at speeds up to 8000 RPM is discussed. The rotational motion of the disk is optically removed by passing the image of the rotating disk through a prism that is traveling at half the rotational speed of the disk. Off-axis double-pulsed laser holography is then used to record the disk resonant vibratory response. The first five diametrical modes and one complex mode of disk vibration are obtained at various RPM. The effects of disk imbalance, misalignment of optical and mechanical axes of rotation and system-excited modes of vibration are also addressed. Selected experimental results are compared to those obtained using finite element analysis. R.J.F.

N83-26812# Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio.
STATISTICAL EXPERIMENTAL DESIGNS IN COMPUTER AIDED OPTIMAL AIRCRAFT DESIGN Final Report c05
K. S. Nagaraja and Ram B. Ram (State Univ. of New York) *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 648-670 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 01/3

A review of the statistical experimental designs which are relevant to the selection process of the design variables is made. Although several aerospace industries still use Latin Square techniques, the inherent shortcomings of the approach are not recognized. Optimal aircraft designs which are derived from such a deficient method become suspect, and reliability and cost saving can both become unattainable. An alternate approach, called D-optimal design, which has several advantages due to its reliability and efficiency, is discussed. R.J.F.

N83-26813# Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio. Analysis and Optimization Branch.
MTBF CONFIDENCE BOUNDS BASED ON MIL-STD-781C FIXED-LENGTH TEST RESULTS Final Report c38
H. Leon Harter *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 671-677 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 14/4

Exact confidence bounds are available for the parameter theta of an exponential distribution in the case of Type II (failure) censored samples, but not in the case of Type I (time) censored samples. In the latter case, the conventional confidence bounds are conservative; Cox proposed approximate confidence bounds which may not be conservative, but have other advantages. For MIL-STD-781C fixed-length tests, there is a mixture of the two types of censoring, Type II for rejected lots and Type I for accepted lots. Epstein proposes combining the exact bounds for rejected lots with the conventional bounds for accepted lots. The latter was replaced by Cox's approximate bounds. It was shown that this gives true confidence levels closer to the nominal levels. R.J.F.

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N83-26814*# Vigyan Research Associates, Inc., Hampton, Va.
FLAT-PLATE DRAG MEASUREMENTS WITH VORTEX GENERATORS IN TURBULENT BOUNDARY LAYER Final Report, 1 Jul. 1980 - 30 Apr. 1983
D. M. Rao and S. C. Mehrotra Hampton, Va. NASA. Langley Research Center Jun. 1983 20 p refs
(Contract NAS1-16283)
(NASA-CR-172125; NAS 1.26:172125; ViRA-83-01) Avail: NTIS HC A02/MF A01 CSCL 01A

Direct drag measurements were obtained on a flat plate with a spanwise row of vortex generators near the leading edge, to produce an array of stream wise vortices within the approaching turbulent boundary layer. The object was to explore the possibility of modifying the large scale structure of the boundary layer through embedded longitudinal vortices with a view to obtaining a reduction in wall shear. Both obstacle and vane type vortex generators were tested at free stream velocities 40 ft/sec to 130 ft/sec corresponding to plate length Reynolds no. 0.3 million to 0.8 million with a nominal boundary layer thickness of approximately 0.6 in. at the leading edge. A few vortex generator configurations were tested both on and off the plate to measure the total drag as well as the plate drag alone. The obstacle type devices reduced the plate drag, indicating that the wake momentum defect predominated even in the presence of streamwise vortices. The vane type vortex generators however always increased the plate drag. Author

N83-26815*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SOME RECENT APPLICATIONS OF XTRAN3S
David A. Seidel, Robert M. Bennett, and Rodney H. Ricketts May 1983 12 p refs Proposed for presentation at the AIAA Appl. Aerodyn. Conf., Danvers, Mass., 13-15 Jul. 1983
(NASA-TM-85641; NAS 1.15:85641) Avail: NTIS HC A02/MF A01 CSCL 01A

A time marching finite difference code, XTRAN3S that solves the three dimensional transonic small perturbation equation for flow over isolated wings was developed. During initial applications of the program, problems were encountered in the prediction of unsteady forces. The use of a revised grid and force calculation scheme improved those predictions. Comparisons are made between predicted and experimental pressure data for a rectangular supercritical wing. Comparisons of steady and unsteady data at M sub infinity = 0.700 show good agreement between calculated

and experimental values. A comparison of steady data at M sub infinity 0.825 shows poor agreement between calculations and experiment. Program difficulties were encountered with swept and tapered configurations. S.L.

N83-26816*# Pratt and Whitney Aircraft Group, East Hartford, Conn. Commercial Engineering.
MODEL AERODYNAMIC TEST RESULTS FOR A REFINED ACTUATED INLET EJECTOR NOZZLE AT SIMULATED TAKEOFF AND CRUISE CONDITIONS Final Report
D. P. Nelson Jun. 1983 80 p refs
(Contract NAS3-22738)
(NASA-CR-168051; NAS 1.26:168051; PWA-5768-29) Avail: NTIS HC A05/MF A01 CSCL 01A

Wind tunnel model tests were conducted to demonstrate the aerodynamic performance improvements of a refined actuated inlet ejector nozzle. Models of approximately one-tenth scale were configured to simulate nozzle operation at takeoff, subsonic cruise, transonic cruise and supersonic cruise. Variations of model components provided a performance evaluation of ejector inlet and exit area, forebody boattail angle and ejector inlet operation in the open and closed mode. Approximately 700 data points were acquired at Mach numbers of 0, 0.36, 0.9, 1.2, and 2.0 for a wide range of nozzle flow conditions. Results show that relative to two ejector nozzles previously tested performance was improved significantly at takeoff and subsonic cruise performance, a C sub f of 0.982, was atttained equal to the high performance of the previous tests. The established advanced supersonic transport propulsion study performance goals were met or closely approached at takeoff and supersonic cruise. Author

N83-26817*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
INPUT GENERATOR FOR DENTON 3-DIMENSIONAL TURBOMACHINE-BLADE-ROW ANALYSIS CODE
Arthur J. Glassman and Jerry R. Wood May 1983 22 p refs
(NASA-TM-23324; E-1565; NAS 1.15:23324) Avail: NTIS HC A02/MF A01 CSCL 01A

A users manual is presented for a computer program that prepares the bulk of the input data set required for the Denton three dimensional turbomachine blade row analysis code. The Denton input is generated from a minimum of geometry and flow variable information by using cubic spline curve fitting procedures. The features of the program are discussed. The input is described and special instructions are included to assist in its preparation. Sample input and output are included. A.R.H.

N83-26818*# McDonnell-Douglas Corp., St. Louis, Mo.
AIRCRAFT AERODYNAMIC PREDICTION METHOD FOR V/STOL TRANSITION INCLUDING FLOW SEPARATION
B. R. Gilmer, G. A. Miner, and D. R. Bristow Moffett Field, Calif. NASA. Ames Research Center Apr. 1983 93 p refs
(Contract NAS2-11161)
(NASA-CR-166467; NAS 1.26:166467) Avail: NTIS HC A05/MF A01 CSCL 01A

A numerical procedure was developed for the aerodynamic force and moment analysis of V/STOL aircraft operating in the transition regime between hover and conventional forward flight. The trajectories, cross sectional area variations, and mass entrainment rates of the jets are calculated by the Adler-Baron Jet-in-Crossflow Program. The inviscid effects of the interaction between the jets and airframe on the aerodynamic properties are determined by use of the MCAIR 3-D Subsonic properties are determined by use of the MCAIR 3-D Subsonic Potential Flow Program, a surface panel method. In addition, the MCAIR 3-D Geometry influence Coefficient Program is used to calculate a matrix of partial derivatives that represent the rate of change of the inviscid aerodynamic properties with respect to arbitrary changes in the effective wing shape. Author

N83-26819*# Pennsylvania State Univ., University Park.
END WALL FLOW CHARACTERISTICS AND OVERALL PERFORMANCE OF AN AXIAL FLOW COMPRESSOR STAGE Final Report
N. Sitaram and B. Lakshminarayana Washington NASA Feb. 1983 141 p refs
(Grant NsG-3032)
(NASA-CR-3671; NAS 1.26:3671; PSU/TURBO-82-5) Avail: NTIS HC A07/MF A01 CSCL 01A

This review indicates the possible future directions for research on endwall flows in axial flow compressors. Theoretical investigations on the rotor blade endwall flows in axial flow compressors reported here include the secondary flow calculation and the development of the momentum integral equations for the prediction of the annulus wall boundary layer. The equations for secondary vorticity at the rotor exit are solved analytically. The solution includes the effects of rotation and the viscosity. The momentum integral equations derived include the effect of the blade boundary layers. The axial flow compressor facility of the Department of Aerospace Engineering at The Pennsylvania State University, which is used for the experimental investigations of the endwall flows, is described in some detail. The overall performance and other preliminary experimental results are presented. Extensive radial flow surveys are carried out at the design and various off design conditions. These are presented and interpreted in this report. The following experimental investigations of the blade endwall flows are carried out. (1) Rotor blade endwall flows: The following measurements are carried out at four flow coefficients. (a) The rotor blade static pressures at various axial and radial stations (with special emphasis near the blade tips). (b) The hub wall static pressures inside the rotor blade passage at various axial and tangential stations. (2) IGV endwall flows: The following measurements are carried out at the design flow coefficient. (a) The boundary layer profiles at various axial and tangential stations inside the blade passage and at the blade exit. (b) Casing static pressures and limiting streamline angles inside the blade passage. B.W.

N83-26820*# United Technologies Corp., Stratford, Conn.
EXPERIMENTAL STUDY OF MAIN ROTOR/TAIL ROTOR/AIRFRAME INTERACTIONS IN HOVER. VOLUME 1: TEXT AND FIGURES
D. T. Balch, A. Saccullo, and T. W. Sheehy Jun. 1983 491 p refs
(Contract NAS2-10770)
(NASA-CR-166485; NAS 1.26:166485; SER-510112-Vol-1) Avail: NTIS HC A21/MF A01 CSCL 01A

To assist in identifying and quantifying the relevant parameters associated with the complex topic of main rotor/fuselage/tail rotor interference, a model scale hover test was conducted in the Model Rotor Hover Facility. The test was conducted using the basic model test rig, fuselage skins to represent a UH-60A BLACK HAWK helicopter, 4 sets of rotor blades of varying geometry (i.e., twist, airfoils and solidity) and a model tail rotor that could be relocated to give changes in rotor clearance (axially, laterally, and vertically), can't angle and operating model (pusher or tractor). The description of the models and the tests, data analysis and summary (including plots) are included. The customary system of units gas used for principal measurements and calculations. Expressions in both SI units and customary units are used with the SI units stated first and the customary units afterwords, in parenthesis. S.L.

N83-26821*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EFFECTS OF VARYING PODDED NACELLE-NOZZLE INSTALLATIONS ON TRANSONIC AEROPROPULSIVE CHARACTERISTICS OF A SUPERSONIC FIGHTER AIRCRAFT
Francis J. Capone and David E. Reubush May 1983 337 p refs
(NASA-TP-2120; L-15525; NAS 1.60:2120) Avail: NTIS HC A15/MF A01 CSCL 01A

The aeropropulsive characteristics of an advanced twin engine fighter designed for supersonic cruise was investigated in the 16 foot Transonic Tunnel. The performance characteristics of advanced nonaxisymmetric nozzles installed in various nacelle locations, the effects of thrust induced forces on overall aircraft aerodynamics, the trim characteristics, and the thrust reverser

performance were evaluated. The major model variables included nozzle power setting; nozzle duct aspect ratio; forward, mid, and aft nacelle axial locations; inboard and outboard underwing nacelle locations; and underwing and overwing nacelle locations. Thrust vectoring exhaust nozzle configurations included a wedge nozzle, a two dimensional convergent divergent nozzle, and a single expansion ramp nozzle, each with deflection angles up to 30 deg. In addition to the nonaxisymmetric nozzles, an axisymmetric nozzle installation was also tested. The use of a canard for trim was also assessed. S.L.

N83-26822*# Lockheed-Georgia Co., Marietta.
EXPERIMENTAL STUDIES OF THE SEPARATING CONFLUENT BOUNDARY-LAYER. VOLUME 1: SUMMARY Final Report
J. A. Braden, R. R. Whipkey, G. S. Jones, and D. E. Lilley NASA Washington Jun. 1983 165 p refs
(Contract NAS1-16028)
(NASA-CR-3655; NAS 1.26:3655; LG-82-ER-0184) Avail: NTIS HC A08/MF A01 CSCL 01A

Test descriptions and results are documented from an experimental, low speed study of the separating confluent boundary layer on a NASA GAW-1 (General Aviation) high lift airfoil. The airfoil was tested in a variety of high lift configurations comprised of leading edge slat and trailing edge flap combinations. The primary test instrumentation was a two dimensional, laser velocimeter (LV) system operating in a backscatter mode. Surface pressures and corresponding LV-derived, boundary layer profiles are given in terms of velocity components, turbulence intensities and Reynolds shear stresses as characterizing confluent boundary layer behavior up to and beyond stall. Comparisons are given between LV-derived profiles and associated boundary layer parameters and those obtained from more conventional instrumentation such as pitot static traverses, Preston tube measurements and hot wire surveys. A descriptive summary of the experimental set up along with limited test results are presented. Pertinent comparisons of the results are made where possible with those from other sources. Author

N83-26823*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EFFECTS OF VARYING PODDED NACELLE-NOZZLE INSTALLATIONS ON TRANSONIC AEROPROPULSIVE CHARACTERISTICS OF A SUPERSONIC FIGHTER AIRCRAFT
Francis J. Capone and David E. Reubush May 1983 337 p refs (NASA-TP-120; NAS 1.60:120) Avail: NTIS HC A15/MF A01 CSCL 01A

The aeropropulsive characteristics of an advanced twin-engine fighter designed for supersonic cruise were investigated in the Langley 16-Foot Transonic Tunnel. The objective of this investigation were to evaluate the performance characteristics of advanced nonaxisymmetric nozzles installed in various nacelle locations, the effects of thrust-induced forces on overall aircraft aerodynamics, the trim characteristics, and the thrust reverser performance. The major model variables included nozzle power setting; nozzle duct aspect ratio; forward, mid, and aft nacelle axial locations; inboard and outboard underwing nacelle locations; and underwing and overwing nacelle locations. Thrust-vectoring exhaust nozzle configurations included a wedge nozzle, a two dimensional convergent-divergent nozzle, and a single-expansion ramp nozzle, each with deflection angles up to 30 deg. In addition to the nonaxisymmetric nozzles, an axisymmetric nozzle installation was also tested. The use of a canard for trim was also assessed. Author

N83-26824# Aeronautical Research Labs., Melbourne (Australia).
PROGRAMS FOR THE TRANSONIC WIND TUNNEL DATA PROCESSING INSTALLATION. PART 10: SIX COMPONENT MEASUREMENTS UPDATED
J. B. Willis 1982 33 p refs
(AD-A122248; ARL-AERO-TECH-MEMO-341-Pt-10; AR-002-900-Pt-10) Avail: NTIS HC A03/MF A01 CSCL 09/2

The current version of the program used for 6 component measurements using strain gauge balances and the PDP8/I installation in the Transonic Wind Tunnel is described. Changes to the original program include on-line display, model weight correction, and operation with the Pollock strain gauge equipment. A.R.H.

N83-26825# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
COMPUTATION OF INCOMPRESSIBLE POTENTIAL FLOW OVER AN AIRFOIL USING A HIGH ORDER AERODYNAMIC PANEL METHOD BASED ON CIRCULAR ARC PANELS Ph.D. Thesis
Jay DeJong Aug. 1982 269 p refs
(AD-A124896; AFIT/DS/AA/82-1) Avail: NTIS HC A12/MF A01 CSCL 12/1

A new two dimensional panel method has been developed. This method uses a new approximating element; the circular arc, and a new singularity representation; the sine series, and all integrations are performed analytically for maximum computational efficiency. The method was applied to a circular cylinder and to several different types of airfoils, and a number of characteristics which define the method were varied to determine their effects on the solution. Major conclusions from this study were that the method produced very accurate solutions over the major part of the airfoil, error reduction occurred as both the number of panels and the number of terms in the series were increased, the effect of point source location was large but was local and could be controlled, the method was generally insensitive to minor variations in panelling, and the accuracy of the solution increased as panel curvature was increased from relatively flat to circular. GRA

N83-26826# Aeronautical Research Inst. of Sweden, Stockholm. Dept. of Aerodynamics.
WIND TUNNEL INVESTIGATION OF SEPARATED FLOW OVER AN AFTERBODY IN SUPERSONIC AXISYMMETRIC STREAM UTILIZING ONE-COMPONENT LASER-DOPPLER-VELOCIMETRY
Johan Agrell Feb. 1983 21 p refs
(Contracts FMV-F-FL-81713-75-038-07-001; FMV-F-FL-82223-77-005-21-001; FMV-F-FL-82223-78-002-21-001; FMV-F-FL-82223-80-001-21-001; FMV-F-FL-82223-80-183-21-001)
(FFA-TN-1983-10) Avail: NTIS HC A02/MF A01

One-component laser Doppler velocimeter (LDV) measurements were made in the flow surrounding an 8 deg conical afterbody of a cone-cylinder strut mounted model in a Mach 2 free stream. The flow over the afterbody separates from the surface due to the influence of a highly underexpanded centered propulsive jet. The wind tunnel flow was seeded with silicon particles giving a good signal for the LDV equipment at all locations except for the separated region, which was seeded locally, by condensing acetone vapor. The results are presented as Mach number profiles at five different locations. These profiles describe the main feature of the flow starting at the surface of the afterbody passing through the separated region, the mixing zone, the separation shock and ending in the free stream. The maximum Mach number obtained in the reversal flow was close to 0.1 and the highest level over the surface was 0.1 of the longitudinal extension. Author (ESA)

N83-26794# Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio.
BOUNDARY-LAYER TRANSITION ON BLUNT, SLENDER CONES AT HYPERSONIC MACH NUMBERS Final Report
Kenneth F. Stetson *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 243-292 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 01/1

N83-26795# Institute for Defense Analyses, Arlington, Va.
A NOTE ON THE OSCILLATION OF CAVITIES COUPLED TO AERODYNAMIC FLOWS Final Report
Alexander H. Flax *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 293-318 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 01/1

N83-26797# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Thermomechanics Branch.
CONSTANT PARAMETER TWO COMPONENT CHANNEL FLOWS Final Report
Kenneth R. Cramer *In its* A Collection of Papers in the Aerospace Sci. Jun. 1982 p 337-357 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 01/1

N83-26803# Flight Dynamics Research Corp., Van Nuys, Calif.
MIXING OF COMPRESSIBLE FLUID WITH APPLICATION TO EJECTOR THRUSTERS Final Report
Morton Alperin and Jiunn-Jenq Wu *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 456-477 ref (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 01/1

N83-26808# Wright State Univ., Dayton, Ohio.
SOME ADVANTAGES OF UNSTEADY AERODYNAMICS Final Report
Hermann Viets *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 567-585 refs (For primary document see N83-26787 16-01)
(Grant AF-AFOSR-3525-78)
Avail: NTIS HC A99/MF A01 CSCL 01/1

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

N83-26827# National Transportation Safety Board, Washington, D. C. Bureau of Accident Investigation.
AIRCRAFT ACCIDENT REPORT: IBEX CORPORATION GATES LEARJET 23, N100TA, ATLANTA, NEAR SAVANNAH, GEORGIA, 6 MAY 1982
8 Apr. 1983 58 p refs
(PB83-910401; NTSB-AAR-83-01) Avail: NTIS HC A04/MF A01 CSCL 01C

On May 6, 1982, at 1155:28 eastern daylight time (edt), while in cruise flight on Airway J79-121 en route to Orlando, Florida, from Teterboro, New Jersey, the flightcrew of N100TA, an IBEX Corporation Gates Learjet 23, was cleared by the Jacksonville Air Route Traffic Control Center to descend from its altitude of Flight Level 410 to Flight Level 390. The flightcrew acknowledged the clearance, and air traffic control observed the radar target descend. About 2 minutes later, the airplane crashed into the Atlantic Ocean, from a steep, high speed descent about 12 miles from Savannah, Georgia. The air atraffic controller made several unsuccessful attempts to contact the airplane. The pilots had reported no difficulties in any of their radio transmissions. The pilot, copilot, and the two passengers on board were killed. The National Transportation Safety Board determines that the probable cause of the accident was an uncontrolled descent from cruise altitude for undetermined reasons, from which a recovery was not or could not be effected. Author

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications.*

N83-26828# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
INVESTIGATION OF A THIRD ORDER BARO-DAMPED VERTICLE CHANNEL OF INS M.S. Thesis
Asad Riaz Dec. 1982 157 p refs
(AD-A124882; AFIT/GE/EE/82D-55) Avail: NTIS HC A08/MF A01 CSCL 17/7

The optimization of the three gains of a third-order baro-inertial vertical channel has been formulated as a stochastic optimal control problem, with the objective of minimizing the mean squared altitude error due to the noise induced altitude error and a disturbance of known magnitude. For a vehicle carrying out a TERCOM-update immediately following a vertical descent, and being subjected to a disturbance input to the vertical channel, optimum gains are presented and the performance is analyzed through a simulated flight in a Monte Carlo analysis. Performance comparisons between the optimized gains and the classical gains are also presented. The results show a significant performance improvement over the classical gains for a vehicle carrying out the TERCOM-update. Author (GRA)

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

N83-26829*# Lightning Technologies, Inc., Pittsfield, Mass.
AIRCRAFT LIGHTNING-INDUCED VOLTAGE TEST TECHNIQUE DEVELOPMENTS Final Report
K. E. Crouch Jun. 1983 71 p refs
(Contract NAS4-2930)
(NASA-CR-170403; NAS 1.26:170403; LT-82-132) Avail: NTIS HC A04/MF A01 CSCL 01C

High voltage safety, fuels safety, simulation, and response/measurement techniques are discussed. Travelling wave transit times, return circuit conductor configurations, LC ladder network generators, and repetitive pulse techniques are also discussed. Differential conductive coaxial cable, analog fiber optic link, repetitive pulse sampled data instrumentation system, flash A/D optic link system, and an FM telemetry system are considered. Author

N83-26830# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DYNAMIC CHARACTERISTICS OF AERIAL REFUELING SYSTEMS M.S. Thesis
Thomas J. Carter, III Dec. 1982 91 p refs
(AD-A124770; AFIT/GAE/AA/82D-4) Avail: NTIS HC A05/MF A01 CSCL 01/2

Two aircraft refueling system configurations were simulated using HYTRAN, an existing transient flow analysis computer program. Transient pressure response subsequent to downstream valve closure was investigated for the KC-135 and a laboratory test rig and compared to available experimental data and previous research. Parametric studies were performed of system variables: valve closure time, valve area versus time (closure curves), and variation in surge attenuation components (surge boot, accumulators). A typical closure curve for quick disconnects was approximated and verified. The simulation results compared favorably with experimental data and previous work. Transient pressure was found to be sensitive to accumulator or surge boot precharge pressure while changes in accumulator volume had little effect. Variations in accumulator entry line diameter or length affected transient pressure and settling time. Increased valve snubbing reduced maximum transient pressures. Author (GRA)

N83-26831*# Boeing Commercial Airplane Co., Seattle, Wash.
SELECTED ADVANCED AERODYNAMICS AND ACTIVE CON-

TROLS TECHNOLOGY CONCEPTS DEVELOPMENT ON A DERIVATIVE B-747 AIRCRAFT Summary Report, May 1977 - May 1979
NASA Washington Jun. 1983 51 p ref
(Contract NAS1-14741)
(NASA-CR-3295; NAS 1.26:3295) Avail: NTIS HC A04/MF A01 CSCL 01C

Analytical design and wind tunnel test evaluations covering the feasibility of applying wing tip extensions, winglets, and active control wing had alleviation to the model B747 are described. Aerodynamic improvement offered by wing tip extension and winglet individually, and the combined aerodynamic and weight improvements when wing load alleviation is combined with the tip extension or the winglet are evaluated. Results are presented in the form of incremental effects on weight mission range, fuel usage, cost, and airline operating economics. Author

N83-26832# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Mechanical Branch.
EXPERIMENTAL ANALYSIS OF THE PERFORMANCE OF AN ANNULAR PERIPHERAL JET VEHICLE IN GROUND EFFECT Final Report, Aug. 1980 - Jan. 1982
Richard J. Almassy Oct. 1982 42 p refs
(AF Proj. 2402)
(AD-A124949; AFWAL-TR-82-3043) Avail: NTIS HC A03/MF A01 CSCL 01/3

Two annular peripheral jet air cushion models were designed, fabricated and tested in-house at the Mobility Development Laboratory (AFWAL/FIEMB) at Wright-Patterson AFB, OH. The vehicles were designed to attain maximum hover height at a fixed level of available power based on Barratt Theory, and achieve maximum static hover stability. The assumptions and analytic development of Barratt Theory are discussed, as well as some design aspects to achieve vehicle cushionborn stability. Test results indicated Barratt lift predictions to be slightly conservative. Both vehicles were unstable at high hover power heights in their basic configurations. The addition of several configurations of vertical strakes compartmenting the cushion area achieved varying improvements to vehicle stability. The addition of full cushion depth cruciform strakes completely stabilized the vehicles. Vehicle instability was concluded to be caused by aerodynamic activity in the cushion area induced by shear from high momentum jet airflow. GRA

N83-26833# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
SURVIVABILITY OF INTERDICTION AIRCRAFT: SENSITIVITY TO TERRAIN FOLLOWING, COMMAND ALTITUDE, VELOCITY AND ELECTRONIC COUNTER MEASURES M.S. Thesis
Mark D. Reid Dec. 1982 230 p refs
(AD-A124870; AFIT/GOR/MA/82D-2) Avail: NTIS HC A11/MF A01 CSCL 01/3

The FORTRAN program TERRAIN is a deterministic model of a tactical aircraft penetrating a Surface-to-Air (SAM) and Anti-Aircraft Artillery (AAA) threat. TERRAIN generates a terrain following flight path profile based on specified flight parameters and then assesses the aircraft vulnerability in terms of exposure time and shots taken by individual threat site and the total defense. Modifications were made to assess aircraft survivability (the probability of kill of the aircraft) and to calculate the effect on the probability of kill of electronic countermeasures. The TERRAIN model is particularly sensitive to the selection of beddown, rate of fire for AAA, aircraft velocity, and aircraft commanded clearance altitude. A comparison of the strengths and weaknesses of the original TERRAIN model, the modified TERRAIN model, and six other SAM/AAA models has been compiled. A user's guide for the modified TERRAIN model is provided. Author (GRA)

N83-26834# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
STATISTICAL REVIEW OF COUNTING ACCELEROMETER DATA FOR NAVY AND MARINE FLEET AIRCRAFT Semiannual Summary Report, 1 Jan. 1962 - 30 Jun. 1982
Warren J. Williams 1 Nov. 1982 158 p
(AD-A124966; NADC-13920-2) Avail: NTIS HC A08/MF A01 CSCL 01/1

This is a semiannual progress report, and it presents a specialized summary of the data in the counting accelerometer program. Statistics describing Navy and Marine aircraft cumulative g-count exceedances are calculated and tabulated. These tabulations are separated by calendar time and into four major categories of Fleet experience: Navy Training, Navy Combat, Marine Training, and Marine Combat. Load rate distributions in counts per 1000 hours are calculated for all g-levels. Distribution statistics (mean, standard deviation, and skewness) are presented for most models. GRA

N83-26835# Calspan Corp., Buffalo, N. Y. Flight Research Dept.
LATERAL FLYING QUALITIES OF HIGHLY AUGMENTED FIGHTER AIRCRAFT, VOLUME 1 Final Report, Mar. 1980 - May 1982
Stephen J. Monagan, Rogers E. Smith, and Randall E. Bailey Wright-Patterson AFB, Ohio AFWAL Jun. 1982 85 p refs
(Contract F33615-79-C-3618)
(AD-A118070; CALSPAN-6645-F-8-Vol-1; AFWAL-TR-81-3171-Vol-1) Avail: NTIS HC A05/MF A01 CSCL 01/3

This in-flight simulation experiment, using the USAF NT-33 variable stability aircraft operated by Calspan, was undertaken to generate lateral-directional flying qualities data applicable to highly augmented fighter aircraft. In particular, the effects of time delay and prefilter lag in the lateral flight control system were studied for representative Flight Phase Category A and C tasks. The combined effects of those elements as well as the effects of nonlinear command gain and high Dutch roll damping were also evaluated. Tasks included were actual target tracking, air refueling and precision landing as well as special Head-Up Display (HUD) tracking tasks. Results indicated that a properly designed HUD bank angle tracking task is a valid flying qualities evaluation task. Data show that lateral flying qualities are very sensitive to control system time delay and very short values of roll mode time constant typically result in poor lateral flying qualities. Excellent separation of the data into flying qualities level is achieved for the Category A task data using time domain equivalent indicated by the data; sensitivity to equivalent time delay is a minimum at this value. Volume I contains the body of the report, while Volume II consists of the Appendices. GRA

N83-26836# Research Inst. of National Defence, Linkoeping (Sweden).
SIMULATION PROGRAM OF ROTARY WINGS [PROGRAM FOER SIMULERING AV HELIKOPTERROTOR]
Anders Wallin Dec. 1982 31 p In SWEDISH
(FOA-C-30308-E1) Avail: NTIS HC A03/MF A01

A computerized simulation program written in FORTRAN for producing images of rotary wings by means of an image-generating infrared camera is described. The rotor image can be completed by adding a function representing the helicopter body. Correlative noise, subdivided in rectangles, can be added to the image. Author (ESA)

N83-26812# Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio.
STATISTICAL EXPERIMENTAL DESIGNS IN COMPUTER AIDED OPTIMAL AIRCRAFT DESIGN Final Report
K. S. Nagaraja and Ram B. Ram (State Univ. of New York) *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 648-670 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 01/3

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

No abstracts in this category.

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N83-26837*# General Applied Science Labs., Inc., Westbury, N.Y.

TESTING OF FELT-CERAMIC MATERIALS FOR COMBUSTOR APPLICATIONS Final Report

R. S. Venkat and Gerald Roffe Apr. 1983 45 p refs Sponsored in part by Army Original doc. contains color illustrations (Contract NAS3-22775)

(NASA-CR-168103; NAS 1.26:168103) Avail: NTIS HC A03/MF A01 CSCL 21E

The feasibility of using composite felt ceramic materials as combustor liners was experimentally studied. The material consists of a porous felt pad sandwiched between a layer of ceramic and one of solid metal. Flat, rectangular test panels, which encompassed several design variations of the basic composite material, were tested, two at a time, in a premixed gas turbine combustor as sections of the combustor wall. Tests were conducted at combustor inlet conditions of 0.5 MPa and 533 K with a reference velocity of 25 m/s. The panels were subjected to a hot gas temperature of 2170 K with 1% of the total airflow used to film cool the ceramic surface of the test panel. In general, thin ceramic layers yield low ceramic stress levels with high felt ceramic interface temperatures. On the other hand, thick ceramic layers result in low felt ceramic interface temperatures but high ceramic stress levels. Extensive thermal cycling appears to cause material degradation, but for a limited number of cycles, the survivability of felt ceramic materials, even under extremely severe combustor operating conditions, was conclusively demonstrated. B.W.

N83-26838*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

DYNAMIC DISTORTION IN A SHORT S-SHAPED SUBSONIC DIFFUSER WITH FLOW SEPARATION

Richard Stumpf, Harvey E. Neumann, and Charles C. Giamati 1983 20 p refs Presented at the 19th Joint Propulsion Conf., Seattle, 27-29 Jun. 1983; sponsored by AIAA, SAE and ASME

(NASA-TM-84312; E-1695; NAS 1.15:84312) Avail: NTIS HC A02/MF A01 CSCL 21E

An experimental investigation of the time varying distortion at the diffuser exit of a subscale HiMAT forebody and inlet was conducted at Mach 0.9 in the Lewis 8 by 6 foot Supersonic Wind Tunnel. A transitory separation was detected within the subsonic diffuser. Vortex generators were installed to eliminate the flow separation. Results from a study of the instantaneous pressure variations at the diffuser exit are presented. The time unsteady total pressures at the diffuser exit are computer interpolated and presented in the form of a movie showing the transitory separation. Limited data showing the instantaneous distortion levels is also presented. Author

N83-26839*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

THRUST PERFORMANCE OF A VARIABLE-GEOMETRY, DIVERGENT EXHAUST NOZZLE ON A TURBOJET ENGINE AT ALTITUDE

David M. Straight and Richard R. Collom Jun. 1983 39 p refs (NASA-TP-2171; E-1451; NAS 1.60:2171) Avail: NTIS HC A03/MF A01 CSCL 21E

A variable geometry, low aspect ratio, nonaxisymmetric, two dimensional, convergent-divergent exhaust nozzle was tested at simulated altitude on a turbojet engine to obtain baseline axial, dry thrust performance over wide ranges of operating nozzle pressure ratios, throat areas, and internal expansion area ratios. The thrust data showed good agreement with theory and scale model test results after the data were corrected for seal leakage and coolant losses. Wall static pressure profile data were also obtained and compared with one dimensional theory and scale model data. The pressure data indicate greater three dimensional flow effects in the full scale tests than with models. The leakage and coolant penalties were substantial, and the method to determine them is included. Author

N83-26840# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

APPLICATION OF THE VORTEX-LATTICE METHOD TO PROPELLER PERFORMANCE ANALYSIS M.S. Thesis

Marc I. Masquelier Jul. 1982 115 p refs (AD-A124837; AFIT/GAE/AA/81D-19) Avail: NTIS HC A06/MF A01 CSCL 12/1

The objective of this thesis is to examine the feasibility of applying a vortex lattice method to propeller performance analysis. This method allows the calculation of spanwise and chordwise pressure distributions on thin propeller blades of arbitrary planform. The research for this project involves the application of a vortex lattice method to a propeller with twisted, non-cambered, constant chord blades. The analysis assumes incompressible, inviscid flow over thin sections. The helical wake is modeled as a series of straight vortex filament segments. A computer code has been developed which uses a vortex lattice method to predict performance for propellers. Results are shown for several operating conditions, using various angle of attack distributions, numbers of blades on the propeller, and advance ratios. Similar results are shown using the blade-element theory for comparison. Results indicate that this vortex lattice method is applicable to initial propeller performance analysis. Author (GRA)

N83-26841# Naval Postgraduate School, Monterey, Calif. Dept. of Aeronautics.

FINITE ELEMENT PROGRAM FOR CALCULATING FLOWS IN TURBOMACHINES WITH RESULTS FOR NASA TASK-1 COMPRESSOR M.S. Thesis

Julian A. Ferguson, III Oct. 1982 248 p refs (AD-A124987) Avail: NTIS HC A11/MF A01 CSCL 20/4

A general mesh generation code (MESHGEN) and finite element flow solver (TURBO) for calculating the flow development through axial turbomachines are fully documented. The finite element approach followed Hirsch and Warzee. Excellent results were obtained for the NASA Task-1 compressor operating with subsonic flow conditions. Construction of the code will allow straightforward extension to transonic flows, turbine stages and multiple stage machines. Author (GRA)

N83-26842# Rolls-Royce Ltd., Derby (England).

METHOD OF STUDYING THE OPERATING TEMPERATURE OF GAS TURBINES

Yu. N. Dotsenko and I. P. Pelepeichenko 13 Jul. 1982 10 p refs Transl. into ENGLISH of Samoletostr. - Tekh. Vozdush. Flota (USSR), v. 45, 1979 p 20-25

(PNR-90159; Trans-15857/TLT-00841) Avail: NTIS HC A02/MF A01

A method for obtaining the temperature of gas turbine aircraft engines using two bulb-thermometers with different thermal inertia characteristics is presented. The thermal balance equations for a

bulb inside a protective shield are developed. Temperature of the gas outside the shield is calculated by allowing for convective heat transfer with the gas and radiant heat exchange with the shield, and for the inertia of one of the thermometers. Maximum relative error is 8%, compared with 34% for single thermometer methods. Author (ESA)

N83-26843# Royal Inst. of Tech., Stockholm (Sweden). Dept. of Aeronautics.
EXPERIMENTAL STUDY OF STRENGTH AND EXISTANCE DOMAIN OF GROUND-TO-AIR INLET VORTICES BY GROUND BOARD STATIC PRESSURE MEASUREMENTS
S. O. Ridder and I. Samuelsson 1982 27 p refs
(PB83-144865; KTH-AERO-TN-62; TRITA-FPT-042) Avail: NTIS HC A03/MF A01 CSCL 21E

When an air inlet is aspirating in close proximity to the ground plane and the inlet under some flow conditions. This vortex could cause problems with foreign object ingestion that might damage the blading of the engine. In this investigation the strength and existence domain of the inlet vortex has been studied in a low speed wind tunnel by measurements of the ground plane time average static pressure below the inlet. GRA

N83-26791# Air Force Aero Propulsion Lab., Wright-Patterson AFB, Ohio. Ramjet Technology Branch.
COAXIAL DUMP COMBUSTOR INVESTIGATIONS Final Report
R. R. Craig, J. E. Drewry, and F. D. Stull *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 145-156 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 21/5

N83-26798# Air Force Aero Propulsion Lab., Wright-Patterson AFB, Ohio. Turbine Engine Div.
THE USE OF VORTEX GENERATORS AS INEXPENSIVE COMPRESSOR CASING TREATMENT Final Report
C. Herbert Law, Arthur J. Wennerstrom, and William A. Buzzell *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 358-371 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 20/5

N83-26806# Air Force Aero Propulsion Lab., Wright-Patterson AFB, Ohio. Turbine Engine Div.
A ONE-DIMENSIONAL PROCEDURE FOR ESTIMATING THE PERFORMANCE OF EJECTOR NOZZLES Final Report
Kervyn D. Mach *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 540-555 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 21/5

N83-26807# Washington Univ., Seattle.
EFFECTS OF NON-CONSTANT ENTHALPY ADDITION ON FAN-NOZZLE COMBINATIONS Final Report
Gordon C. Oates and Walter M. Persz, Jr. (Pratt and Whitney Aircraft Group) *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 556-566 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 21/5

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N83-26844*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
DETERMINATION OF STABILITY AND CONTROL PARAMETERS OF A GENERAL AVIATION AIRPLANE FROM FLIGHT DATA
Imran Abbasy Mar. 1983 45 p refs
(NASA-TM-84635; NAS 1.15:84635) Avail: NTIS HC A03/MF A01 CSCL 01C

Values for the stability and control parameters for a general aviation airplane were determined from flight data. Lateral and longitudinal transient maneuvers were analyzed by the equation error and output error methods. There was a good agreement between the parameters extracted from flight data and those predicted by wind tunnel. Author

N83-26845*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A FLIGHT-TEST AND SIMULATION EVALUATION OF THE LONGITUDINAL FINAL APPROACH AND LANDING PERFORMANCE OF AN AUTOMATIC SYSTEM FOR A LIGHT WING LOADING STOL AIRCRAFT
Stuart C. Brown, Gordon H. Hardy, and William S. Hindson Jun. 1983 59 p refs
(NASA-TM-84270; A-8993; NAS 1.15:84270) Avail: NTIS HC A04/MF A01 CSCL 01C

As part of a comprehensive flight-test program of STOL operating systems for the terminal area, an automatic landing system was developed and evaluated for a light wing loading turboprop aircraft. The aircraft utilized an onboard advanced digital avionics system. Flight tests were conducted at a facility that included a STOL runway site with a microwave landing system. Longitudinal flight-test results were presented and compared with available (basically CTOL) criteria. These comparisons were augmented by results from a comprehensive simulation of the controlled aircraft which included representations of navigation errors that were encountered in flight and atmospheric disturbances. Acceptable performance on final approach and at touchdown was achieved by the autoland (automatic landing) system for the moderate winds and turbulence conditions encountered in flight. However, some touchdown performance goals were marginally achieved, and simulation results suggested that difficulties could be encountered in the presence of more extreme atmospheric conditions. Suggestions were made for improving performance under those more extreme conditions. Author

N83-26846*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
PILOT HUMAN FACTORS IN STALL/SPIN ACCIDENTS OF SUPERSONIC FIGHTER AIRCRAFT
Seth B. Anderson, Einer K. Enevoldson, and Luat T. Nguyen May 1983 12 p refs Presented at the AGARD Conf. Flight Mech. Sys. Design Lessons from Operational Exper., Athens, 10-13 May 1983
(NASA-TM-84348; A-9297; NAS 1.15:84348) Avail: NTIS HC A02/MF A01 CSCL 01C

A study has been made of pilot human factors related to stall/spin accidents of supersonic fighter aircraft. The military specifications for flight at high angles of attack are examined. Several pilot human factors problems related to stall/spin are discussed. These problems include (1) unsatisfactory nonvisual warning cues; (2) the inability of the pilot to quickly determine if the aircraft is spinning out of control, or to recognize the type of spin; (3) the inability of the pilot to decide on and implement the correct spin recovery technique; (4) the inability of the pilot to move, caused by high angular rotation; and (5) the tendency of pilots to wait too long in deciding to abandon the irrecoverable aircraft. Psycho-physiological phenomena influencing pilot's behavior in stall/spin situations include (1) channelization of sensory inputs, (2) limitations in precisely controlling several muscular inputs, (3) inaccurate judgment of elapsed time, and (4) disorientation of vestibulo-ocular inputs. Results are given of pilot responses to all these problems in the F14A, F16/AB, and F/A-18A aircraft. The use of departure spin resistance and automatic spin prevention systems incorporated on recent supersonic fighters are discussed. These systems should help to improve the stall/spin accident record with some compromise in maneuverability. Author

N83-26847# Federal Aviation Agency, Atlantic City, N.J.
DIGITAL FLIGHT CONTROL SYSTEM VALIDATION
Donald Eldredge, John E. Reed, Ellis Hitt (Battelle Columbus Labs., Ohio), Jeff Webb (Battelle Columbus Labs., Ohio), and Dennis Mulcare (Lockheed-Georgia Co.) Jun. 1982 19 p refs Presented at the 1982 Am. Control Conf., Arlington, Va., Jun. 1982
(AD-A124506; FAA-CT-82-54) Avail: NTIS HC A02/MF A01 CSCL 01/3

The introduction of advanced technologies, new design concepts, and sophisticated high integrity integrated software-based digital flight control and avionics systems has confronted the FAA with the task of reviewing, revising, and updating its airworthiness assessment criteria in these areas. The FAA needs to establish and maintain systems engineering expertise as well as a capability to establish/evaluate validation/verification procedures for software-based digital systems. In order to accomplish this objective, the FAA must have expertise in fault-insertion techniques, emulation, automated reliability analyses, failure modes and effects analyses, fault-tree graphics, and other analytical tools. In addition, these skills are needed in order to interpret and evaluate data and information submitted, during the certification, process, in compliance with RTCA DO-178 and FAA Advisory Circular 25:1309-XX. This paper discusses techniques, methodologies, data, and information required for digital flight control and avionics systems validation. Author (GRA)

N83-26848# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
HIGH-GAIN ERROR ACTUATED FLIGHT CONTROL SYSTEMS FOR CONTINUOUS LINEAR MULTIVARIABLE PLANTS M.S. Thesis
Lewis Thomas Dec. 1982 151 p refs
(AD-A124871; AFIT/GAE/EE/82D-1) Avail: NTIS HC A08/MF A01 CSCL 01/3

The theory of high-gain error actuated feedback control, developed by Porter and Bradshaw, is applied to the design of various lateral-directional decoupling flight control systems for an advanced aircraft. The controllers developed in this report utilize output feedback with proportional plus integral control to produce desirable closed-loop responses with minimal interactions between outputs. Because of the structure of the system, measurement variables in addition to the outputs are necessary to apply this method. The report examines controller design robustness by varying the flight conditions or maneuver commands from the ones the controller is specifically designed for, and then judges system performance. The results show that the controller is robust with respect to varying flight conditions, but is not robust with respect to varying maneuver commands. This report also examines the effect of first-order actuator dynamics in the system model. Actuator dynamics are shown to significantly effect the control system response, indicating that a simplified model, without actuators, is not desireable in one's control design scheme. Also a computer program to determine transmission zeros and decoupling zeros is developed. Author (GRA)

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N83-26849*# Sinacori (John B.) Associates, Hollister, Calif.
RESEARCH AND ANALYSIS OF HEAD-DIRECTED AREA-OF-INTEREST VISUAL SYSTEM CONCEPTS
John B. Sinacori Jun. 1983 81 p refs
(Contract NAS2-10934)
(NASA-CR-166480; NAS 1.26:166480) Avail: NTIS HC A05/MF A01 CSCL 14B

An analysis and survey with conjecture supporting a preliminary data base design is presented. The data base is intended for use in a Computer Image Generator visual subsystem for a rotorcraft flight simulator that is used for rotorcraft systems development, not training. The approach taken was to attempt to identify the visual perception strategies used during terrain flight, survey environmental and image generation factors, and meld these into a preliminary data base design. This design is directed at Data Base developers, and hopefully will stimulate and aid their efforts to evolve such a Base that will support simulation of terrain flight operations. Author

N83-26792# Arizona Univ., Tucson. Dept. of Aerospace and Mechanical Engineering.
A NOTE ON ADAPTIVE WIND TUNNELS WITH IMPERFECT CONTROL Final Report
William R. Sears *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 191-207 refs (For primary document see N83-26787 16-01)
(Grant AF-AFOSR-2954E-76)
Avail: NTIS HC A99/MF A01 CSCL 14/2

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N83-26850*# Martin Marietta Aerospace, Denver, Colo.
DEFINITION OF TECHNOLOGY DEVELOPMENT MISSIONS FOR EARLY SPACE STATION SATELLITE SERVICING, VOLUME 1 Final Report
May 1983 77 p 2 Vol.
(Contract NAS8-35042)
(NASA-CR-170786; NAS 1.26:170786; SSS-SR-04-01) Avail: NTIS HC A05/MF A01 CSCL 22A

The testbed role of an early manned space station in the context of a satellite servicing evolutionary development and flight demonstration technology plan which results in a satellite servicing operational capability is defined. A satellite servicing technology development mission (a set of missions) to be performed on an early manned space station is conceptually defined. S.L.

N83-26851*# Martin Marietta Aerospace, Denver, Colo.
DEFINITION OF TECHNOLOGY DEVELOPMENT MISSIONS FOR EARLY SPACE STATION SATELLITE SERVICING, VOLUME 2 Final Report
May 1983 188 p refs 2 Vol.
(Contract NAS8-35042)
(NASA-CR-170787; NAS 1.26:170787; SSS-SR-04-01) Avail: NTIS HC A09/MF A01 CSCL 22A

The results of all aspects of the early space station satellite servicing study tasks are presented. These results include identification of servicing tasks (and locations), identification of servicing mission system and detailed objectives, functional/operational requirements analyses of multiple servicing scenarios, assessment of critical servicing technology capabilities and development of an evolutionary capability plan, design and validation of selected servicing technology development missions (TDMs), identification of space station satellite servicing accommodation needs, and the cost and schedule implications of acquiring both required technology capability development and conducting the selected TDMs. S.L.

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

N83-26852# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

POST-FLIGHT TRAJECTORY RECONSTRUCTION OF A MANEUVERING REENTRY VEHICLE FROM RADAR MEASUREMENTS M.S. Thesis
Larry Neale Lillard Dec. 1982 153 p refs
(AD-A124805; AFIT/GA/AA/82D-5) Avail: NTIS HC A08/MF A01 CSCL 16/2

A technique for determining the aerodynamic parameters of a maneuvering reentry vehicle (MaRV) from post-flight analysis of radar tracking data was developed. The technique uses a sequential weighted least squares estimator which steps through the data processing batches of data sequentially. The observations consisted of angle and range measurements from a precision tracking radar located in the vicinity of the impact area. A six dimension estimator consisting of three position and three velocity components was designed for estimating the state of the RV during free flight. Two reentry estimators were developed. One, a seven dimension estimator consisting of the six elements of the free-flight estimator plus the ballistic coefficient, was designed to estimate the state during ballistic reentry. The second is the nine element MaRV estimator used once a maneuver is begun. An algorithm based on measurement residual monitoring was developed to switch adaptively from the six-state estimator to the seven-state estimator and then to the nine-state estimator. A series of numerical simulations was performed to validate the technique and its programming. Monte Carlo simulations were used to verify the accuracy of the estimator covariance matrix. Author (GRA)

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

No abstracts in this category.

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N83-26853*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LARGE SPACE ANTENNA SYSTEMS TECHNOLOGY, PART 1
E. Burton Lightner, comp. May 1983 596 p refs Conf. held in Hampton, Va., 30 Nov. - 3 Dec. 1982 2 Vol.
(NASA-CP-2269-Pt-1; L-15614-Pt-1; NAS 1.55:2269-Pt-1) Avail: NTIS HC A25/MF A01 CSCL 22B

A compilation of the unclassified papers presented at the NASA Conference on Large Space Antenna Systems Technology covers the following areas: systems, structures technology, control technology, electromagnetics, and space flight test and evaluation. For individual titles, see N83-26854 through N83-26878.

N83-26854*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
LARGE SPACEBORNE ANTENNA TECHNOLOGY: A SYSTEM PERSPECTIVE
F. Naderi *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 1 May 1983 p 1-16 (For primary document see N83-26853 16-15)
Avail: NTIS HC A25/MF A01 CSCL 22B

Land Mobile Satellite System (LMSS) is a communication system which provides radio communication to a large group of users within a vast geographical area (e.g. communications to and from mobile vehicles anywhere within the U.S.). Such radio communication may be in the form of radio telephone, paging, dispatch, or data transmission. The intended applications of LMSS range from emergency medical to disaster relief, from law enforcement to truck dispatch. By providing service to vast rural areas, LMSS compliments the current terrestrial service in the metropolitan areas and hence provides for a nationally ubiquitous coverage. Author

N83-26855*# General Electric Co., Philadelphia, Pa. Space System Div.
LAND MOBILE SATELLITE SYSTEM REQUIREMENTS
John D. Kiesling *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 1 May 1983 p 17-28 (For primary document see N83-26853 16-15)
Avail: NTIS HC A25/MF A01 CSCL 22B

A Land Mobile Satellite System (LMSS) provides voice, data and related communications services to moving vehicles and persons. Communications between the mobiles and satellite are in the 806-890 MHz band. The satellite translates these signals to a "fixed services band" such as 14/12 GHz band (Ku-band), and communicates in this band with fixed terminals called gateways. The gateways are located at convenient places such as telephone switches (which provide entry into the national telephone system), dispatcher headquarters, computer centers, etc. Communications are therefore principally mobile to fixed. A third communications link, also at Ku-band, is needed between the satellite and a single fixed ground station. This link provides satellite command, telemetry and ranging and also provides a network control function. The latter, through a common signalling system, receives requests and assigns channel slots, and otherwise controls, monitors and polices the network and collects billing information. Author

N83-26856*# TRW Space Technology Labs., Redondo Beach, Calif.
SATELLITE SYSTEMS REQUIREMENTS FOR LAND MOBILE COMMUNICATIONS
M. Horstein *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 1 May 1983 p 29-46 refs (For primary document see N83-26853 16-15)
Avail: NTIS HC A25/MF A01 CSCL 22B

The system design objective is to provide a satellite link through a gateway station, connecting mobile users in areas not served by a terrestrial cellular system to the switched telephone network (STN). The proposed frequency allocation comprises a pair of 10-MHz bands in the 806-890 MHz range specified by the 1979 World Administrative Radio Conference (WARC) for land-mobile satellite service (LMSS). The satellite design is constrained by projected STS capability with an upper stage of the wide-body Centaur or Integral Propulsion System (IPS) type. For the latter (a TRW design), the payload is limited to approximately 10,400 lb. The design is to be based on 1990's technology, with initial operating capability scheduled for 1995. The satellite should be designed for a 7-year life. Mobile-unit compatibility with cellular system specifications is desirable, if consistent with other system requirements. Author

N83-26857*# National Aeronautics and Space Administration, Washington, D. C.
AUDIO DIRECT BROADCAST SATELLITES
J. E. Miller *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 1 May 1983 p 47-52 refs (For primary document see N83-26853 16-15)
Avail: NTIS HC A25/MF A01 CSCL 22B

Satellite sound broadcasting is, as the name implies, the use of satellite techniques and technology to broadcast directly from space to low-cost, consumer-quality receivers the types of sound programs commonly received in the AM and FM broadcast bands. It would be a ubiquitous service available to the general public in the home, in the car, and out in the open. Author

N83-26858*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
LARGE DEPLOYABLE REFLECTOR: AN INFRARED AND SUBMILLIMETER ORBITING OBSERVATORY
Paul N. Swanson (JPL) and M. K. Kiya *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 1 May 1983 p 53-60 (For primary document see N83-26853 16-15)
Avail: NTIS HC A25/MF A01 CSCL 22B

The Large Deployable Reflector (LDR) is to be a dedicated astronomical observatory in space. It will operate in the 1 mm to 30 micron wavelength region where the Earth's atmospheric opacity makes ground-based observations nearly impossible. The primary mirror will be 20 m in diameter, made up of 37 individual segments. The reflector will be actively controlled to provide an overall surface accuracy of less than or approximately 2 microns. The LDR will be placed in orbit by the Space Shuttle and revisited at approximately 2 year intervals during its 10 year lifetime. Author

N83-26859*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ANTENNA TECHNOLOGY FOR ORBITAL VERY LONG BASE-LINE INTERFEROMETRY (VLBI)
E. C. Hamilton *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 1 May 1983 p 61-80 refs (For primary document see N83-26853 16-15)
Avail: NTIS HC A25/MF A01 CSCL 22B

Since it is not economically feasible to construct steerable antennas much larger than 100 meters on Earth (400 meters for fixed telescopes), radio interferometry became a very useful technique for high resolution astronomy observations of quasars, galactic nuclei, and interstellar hydroxyl (OH) and water vapor (H2O) masers. The subsystems necessary to do the space VLBI experiment appear are available but require space qualifications. There are several 50-meter antenna concepts that could be used. Certainly there are problems to be solved. Feed positioning with respect to reflector, pointing such a large structure to accuracy indicated, and integration into the Shuttle control system are all significant engineering challenges. However, there are no problems that are insurmountable in the latter part of this decade. Author

N83-26860*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PUSHBROOM RADIOMETRY AND ITS POTENTIAL USING LARGE SPACE ANTENNAS
Richard F. Harrington and Lloyd S. Keafer, Jr. *In its* Large Space Antenna Systems Technol., Pt. 1 May 1983 p 81-104 ref (For primary document see N83-26853 16-15)
Avail: NTIS HC A25/MF A01 CSCL 22B

Electromagnetic radiation is emitted by matter which was heated to a temperature above absolute zero. The amount of blackbody radiation in the microwave frequency region of interest (10 to the 8th power $< f <$ 10 to the 10th power Hz) emitted by matter can be determined from the Rayleigh-Jeans approximation to Planck's Radiation Law. The amount of electromagnetic radiation from matter which is not a blackbody is a function of the emissivity of the material. The emissivity is a factor less than unity and is a function of several parameters including chemical composition, temperature, frequency, surface characteristics, and viewing angle. A radiometer is an instrument which detects and provides a measure of the electromagnetic radiation being emitted by a material or surface area within the radiometer's antenna beamwidth. Microwave radiometers provide the capability for remote measurements from Earth orbits of geophysical parameters. These measurements will require the use of a microwave imaging radiometer using a large aperture deployable antenna with multiple beams in a pushbroom mode to achieve high spatial resolution and large swath width. Author

N83-26861*# Martin Marietta Aerospace, Denver, Colo.
EARTH OBSERVATION SYSTEM: SPACECRAFT DESIGN
J. J. Herbert and Will A. Schartel *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 1 May 1983 p 105-130 (For primary document see N83-26853 16-15)
Avail: NTIS HC A25/MF A01 CSCL 22B

The Earth Observation Satellite (EOS) was a study funded by NASA Langley Research Center. The study was a system investigation of the total spacecraft integration with its major subsystems and sensors. Mission optimization and ranking using various sensors was also an objective of the contract. Integrating the spacecraft and major subsystems with the large microwave radiometer was done, essentially making the radiometer a free-flyer without an external spacecraft. Another program objective was to provide design and analysis data on microwave radiometer satellites augmented with additional Earth, ocean, and atmospheric sensors. A top-down systems approach resulted in a detailed design integrating subsystems and sensors into the microwave support structure. An important objective of the program was to identify technology needs for Earth observation satellites. The definition and understanding of these design drivers are critical in order to set priorities for future EOS work. Author

N83-26862*# Martin Marietta Aerospace, Denver, Colo.
A 15-METER DEPLOYABLE APERTURE MICROWAVE RADIOMETER
J. V. Coyner, Jr. *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 1 May 1983 p 131-156 (For primary document see N83-26853 16-15)
Avail: NTIS HC A25/MF A01 CSCL 22B

The Large Antenna Multifrequency Microwave Radiometer (LAMMR) was a 4-meter-diameter mechanically scanned (at 1 rps) antenna operating at frequencies from 4.3 to 36 GHz. This LAMMR system was scheduled to fly on the National Oceanic Satellite System (NOSS) in 1986 to measure sea surface temperature and wind speed along with several other atmospheric and sea ice parameters. The LAMMR was limited to a 4-meter solid reflector to stay within the Shuttle/NOSS launch volume and to operate with radiometric precision up to 36.5 GHz. Under the 4-meter aperture constraint, LAMMR could not meet the user resolution requirement for sea surface temperature (25 km minimum, 50 km goal) in an RFI free band, i.e., 4.3 GHz. This study explores the feasibility of meeting this requirement goal with a 15-meter mechanically scanned deployable reflector. Two other research objectives can also be studied by adding one active (approximately 5 GHz) and two additional passive (1.4 and 6.4 GHz) channels to investigate soil moisture and precipitation profiles over land. These two objectives are closely related because the precipitation is the source of the soil moisture in unirrigated regions, and the soil moisture changes between samples (2/day) could indicate that precipitation may have occurred while the sensor was not in view. B.W.

N83-26863*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SYSTEMS DESIGN AND COMPARATIVE ANALYSIS OF LARGE ANTENNA CONCEPTS
L. Bernard Garrett and Melvin J. Ferebee, Jr. *In its* Large Space Antenna Systems Technol., Pt. 1 May 1983 p 157-174 refs (For primary document see N83-26853 16-15)
Avail: NTIS HC A25/MF A01 CSCL 22B

Conceptual designs are evaluated and comparative analyses conducted for several large antenna spacecraft for Land Mobile Satellite System (LMSS) communications missions. Structural configurations include trusses, hoop and column and radial rib. The study was conducted using the Interactive Design and Evaluation of Advanced Spacecraft (IDEAS) system. The current capabilities, development status, and near-term plans for the IDEAS system are reviewed. Overall capabilities are highlighted. IDEAS is an integrated system of computer-aided design and analysis software used to rapidly evaluate system concepts and technology needs for future advanced spacecraft such as large antennas, platforms, and space stations. The system was developed at Langley to meet a need for rapid, cost-effective, labor-saving approaches to the design and analysis of numerous missions and total spacecraft system options under consideration. IDEAS consists of about 40 technical modules efficient executive,

data-base and file management software, and interactive graphics display capabilities. B.W.

N83-26864*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LARGE SPACE SYSTEMS AUXILIARY PROPULSION REQUIREMENTS
Joseph E. Maloy and William W. Smith (Boeing Aerospace Co., Seattle, Wash.) *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 1 May 1983 p 175-200 refs (For primary document see N83-26853 16-15)
Avail: NTIS HC A25/MF A01 CSCL 22B

To meet the needs of a variety of civilian and military missions objectives large space systems (LSS) will become a greater percentage of our orbiting hardware. These LSS's will be transported to low Earth orbit (LEO) by the space transportation system (STS Shuttle). Concurrently, for LSS missions to orbit higher than LEO, the predominant mission scenario is that the LSS will be deployed or assembled in LEO and then transferred to a higher orbit. In support of the LSS concepts, the Office of Aeronautics and Space Technology (OAST) has sponsored studies to determine LSS mission propulsion requirements. Since the fall of 1979, the Boeing Aerospace Company, under contract to NASA and Lewis Research Center, has been studying the disturbance forces and torques that will be experienced by LSS, and they have identified some of the associated auxiliary propulsion systems (APS) requirements. This presentation provides an insight into the results of some of the APS studies, focusing primarily on the APS requirements of single Shuttle launchable LSS's. Author

N83-26865*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A SUMMARY OF MISSION AND SYSTEM PERFORMANCE REQUIREMENTS FOR LARGE SPACE ANTENNAS
Lloyd S. Keafer, Jr. and W. R. Hook *In its* Large Space Antenna Systems Technol., Pt. 1 May 1983 p 201-212 refs (For primary document see N83-26853 16-15)
Avail: NTIS HC A25/MF A01 CSCL 22B

Mission definition studies and system analyses have been described for a number of potential civilian missions and a few military missions. In this paper, an attempt is made to summarize the most formidable mission and system performance requirements for large space antennas. The emphasis will be on the civilian systems; only those aspects of military mission and system requirements that are unclassified are included. Author

N83-26866*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SPACECRAFT MATERIALS RESEARCH: A NASA PERSPECTIVE
Darrel R. Tenny *In its* Large Space Antenna Systems Technol., Pt. 1 May 1983 p 213-240 refs (For primary document see N83-26853 16-15)
Avail: NTIS HC A25/MF A01 CSCL 22B

This paper reviews NASA's spacecraft materials research program. This is a multicenter program and includes research in the following areas: space environmental effects on materials, low expansion composites, fatigue and fracture of composites, thermal control coatings, and contamination. Research to date has concentrated on current graphite-reinforced composites and polymer systems, and developing analytical models to explain observed changes in mechanical, physical, and optical properties. As a result of these research efforts, new experimental facilities have been developed to simulate the space environment and measure the observed property changes. Chemical and microstructural analyses have also been performed to establish damage mechanisms and the limits for accelerated testing. The implications of these results on material selection and system performance are discussed, and additional research needs and opportunities in the area of tougher resin/matrix and metal/matrix composites are identified. Author

N83-26867*# Lockheed Missiles and Space Co., Sunnyvale, Calif.
SPACECRAFT MATERIAL APPLICATIONS: LONG-TERM STABILITY QUESTIONS
F. W. Crossman *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 1 May 1983 p 241-256 refs (For primary document see N83-26853 16-15)
Avail: NTIS HC A25/MF A01 CSCL 22B

An examination of the materials concerns for a variety of spacecraft components shows that long-term stability within the space environments is a major issue in the design of large space antenna systems. This survey paper will review some of the more recent work on the effect of space environment on (1) thin films, (2) structural composites, and (3) thermal control materials. Degradation in thermal-mechanical and optical properties associated with atmospheric and trapped particles and ultraviolet light will be highlighted. Finally, the dimensional instability associated with microcracking during thermal cycling will be examined and a methodology for estimating thermal fatigue effects from results of mechanical fatigue tests will be presented. Author

N83-26868*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ADVANCES IN STRUCTURAL CONCEPTS
Martin M. Mikulas, Jr. and Harold G. Bush *In its* Large Space Antenna Systems Technol., Pt. 1 May 1983 p 257-284 refs (For primary document see N83-26853 16-15)
Avail: NTIS HC A25/MF A01 CSCL 22B

A number of different structural concepts are currently under development as a means of placing large structures in orbit. Three commonly considered concepts are described. The radial rib structure and the hoop-column structure have undergone considerable early development because of their seeming potential for providing a reliably deployable reflector surface. In the present paper, attention is focused on truss structures which historically have been widely used in ground based structures because of their inherent simplicity, versatility, and high stiffness. B.W.

N83-26869*# Massachusetts Inst. of Tech., Cambridge. Dept. of Aeronautics and Astronautics.
MANNED ASSEMBLY OF SPACE STRUCTURES
David Akin, Mary Bowden, and James Mar *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 1 May 1983 p 285-300 refs (For primary document see N83-26853 16-15)
Avail: NTIS HC A25/MF A01 CSCL 22B

This presentation will describe some results which have been obtained and the experiments which have been conducted in the Marshall Space Flight Center's Neutral Buoyancy Facility (MSFC NBF). The MSFC NBF is a tank of water 40 feet deep and 70 feet in diameter. Presently there is a mockup of the Orbiter payload bay at the bottom. There also is a Remote Manipulator System at the edge of the tank. B.W.

N83-26870*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
NASA/USAF RESEARCH IN STRUCTURAL DYNAMICS
L. D. Pinson and A. K. Amos (AFOSR) *In its* Large Space Antenna Systems Technol., Pt. 1 May 1983 p 301-344 refs (For primary document see N83-26853 16-15)
Avail: NTIS HC A25/MF A01 CSCL 22B

Research in the structural dynamics of large space structures is discussed. The problems of structural response are emphasized. Dynamic modeling, structural members, finite element techniques, axial loads, and vibration tests are among the topics discussed. R.J.F.

N83-26871*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
STRUCTURES FOR LARGE PRECISION REFLECTORS
J. M. Hedgepeth (Astro Research Corp., Carpinteria, Calif.) and W. H. Greene *In its* Large Space Antenna Systems Technol., Pt. 1 May 1983 p 361-380 refs (For primary document see N83-26853 16-15)

Avail: NTIS HC A25/MF A01 CSCL 22B

The design and fabrication of a highly accurate large aperture infrared reflecting telescope is discussed. The structural concept is an off axis Cassegrainian design with a focal length equal to the aperture diameter. Thermal shielding, peak heat fluxes, cooling rates, active control tasks, and deployment sequence are discussed. R.J.F.

N83-26872*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SURVEY OF DEPLOYABLE ANTENNA CONCEPTS
R. E. Freeland *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 1 May 1983 p 381-422 (For primary document see N83-26853 16-15)
Avail: NTIS HC A25/MF A01 CSCL 22B

Deployable space antenna concepts are surveyed. Precision reflector antennas, stiffened membrane antennas, truss antennas, infrared antennas, and electrostatically figured membrane reflectors are described. R.J.F.

N83-26873*# Lockheed Missiles and Space Co., Sunnyvale, Calif.
WRAP-RIB ANTENNA CONCEPT DEVELOPMENT OVERVIEW
A. A. Woods, Jr. and N. F. Garcia *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 1 May 1983 p 423-468 (For primary document see N83-26853 16-15)
Avail: NTIS HC A25/MF A01 CSCL 22B

The wrap rib antenna design of a parabolic reflector large space antenna is discussed. Cost estimates, design/mission compatibility, deployment sequence, ground based tests, and fabrication are discussed. R.J.F.

N83-26874*# Harris Corp., Melbourne, Fla.
HOOP/COLUMN ANTENNA DEVELOPMENT PROGRAM
M. R. Sullivan *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 1 May 1983 p 469-512 (For primary document see N83-26853 16-15)
Avail: NTIS HC A25/MF A01 CSCL 22B

The development of the hoop/column spacetenna reflector is discussed. Schedules, mission configurations, systems compatibility, deployment sequence, cable development, and ground model fabrication and assembly are discussed. R.J.F.

N83-26875*# General Dynamics/Convair, San Diego, Calif.
STATUS OF DEPLOYABLE GEO-TRUSS DEVELOPMENT
J. A. Fager *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 1 May 1983 p 513-526 (For primary document see N83-26853 16-15)
Avail: NTIS HC A25/MF A01 CSCL 22B

The development of a deployable geo-truss spacetenna reflector is discussed. The design of the antenna is discussed. The proof of concepts development program is described. R.J.F.

N83-26876*# Martin Marietta Aerospace, Denver, Colo.
BOX TRUSS DEVELOPMENT AND APPLICATIONS
J. V. Coyner, Jr. *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 1 May 1983 p 527-544 (For primary document see N83-26853 16-15)
Avail: NTIS HC A25/MF A01 CSCL 22B

The development and applications of a box truss design for large space antennas are discussed. A kinematic model with a mesh reflector was constructed. A prototype cube is described. Details of fabrication are given. R.J.F.

N83-26877*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
INFLATED ANTENNAS
G. J. Friese (L'Garde, Inc., Newport Beach, Calif.), M. Thomas (L'Garde, Inc., Newport Beach, Calif.), and W. F. Hinson *In its* Large Space Antenna Systems Technol., Pt. 1 May 1983 p 545-574 refs (For primary document see N83-26853 16-15)
Avail: NTIS HC A25/MF A01 CSCL 22B

Inflatable space antennas are discussed. A brief history of inflatable structures is given. Several antenna configurations are described. The antenna configuration consisting of a thin film cone and parabolic held to the proper shape by internal pressure is discussed in detail. R.J.F.

N83-26878*# Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
ELECTROSTATICALLY FIGURED MEMBRANE REFLECTORS: AN OVERVIEW
J. H. Lang *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 1 May 1983 p 575-582 refs (For primary document see N83-26853 16-15)
Avail: NTIS HC A25/MF A01 CSCL 22B

Electrostatically figured membrane reflectors (EFMR) are described. Static and dynamic models were developed and verified. The models were used to develop control systems capable of stabilizing EFMR instabilities and providing EFMR disturbance rejection. Expected reflector figure diameter to surface tolerance ratios are given. R.J.F.

N83-26879*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LARGE SPACE ANTENNA SYSTEMS TECHNOLOGY, PART 2
E. Burton Lightner, comp. May 1983 469 p refs Conf. held in Hampton, Va., 30 Nov. - 3 Dec. 1982 2 Vol.
(NASA-CP-2269-Pt-2; L-15614-Pt-2; NAS 1.55:2269-Pt-2) Avail: NTIS HC A20/MF A01 CSCL 22B

Control technology, electromagnetics, and space flight test and evaluation are addressed. For individual titles, see N83-26880 through N83-26906.

N83-26880*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CONTROL OF LARGE SPACE ANTENNAS
A. F. Tolivar and S. J. Wang *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 2 May 1983 p 583-608 (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01 CSCL 22B

The NASA large space antenna missions, the performance requirements, and the resulting control technology requirements are summarized. Author

N83-26881*# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
ENABLING TECHNOLOGIES FOR LARGE PRECISION SPACE SYSTEMS
Robert R. Strunce, Jr. and James D. Turner *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 2 May 1983 p 601-624 refs (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01 CSCL 22B

Modeling accuracy, system identification, control law design methodology, sensors and actuators, and avionics are addressed. Author

N83-26882*# Grumman Aerospace Corp., Bethpage, N.Y.
REDUCED ORDER CONTROL DESIGN FOR LARGE SPACE STRUCTURES: A COMMUNICATION SATELLITE EXAMPLE
Richard Grant *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 2 May 1983 p 625-648 refs (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01 CSCL 22B

Large flexible communication satellite controller design is considered. The satellite that was developed for a 'straw man' was configured as an offset fed paraboloid with a set of masts and booms that carry the antenna. The controllers were both a boom and mast actuator and a set of two degree of freedom actuators at the antenna to move it in order to satisfy both line of sight and defocus control. Author

N83-26883*# Scientific Systems, Inc., Cambridge, Mass.
CURRENT STATUS OF SYSTEM IDENTIFICATION METHODOLOGY
W. E. Larimore, R. K. Mehra, D. E. Gustafson, and J. Baillieul *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 2 May 1983 p 649-664 refs (For primary document see N83-26879 16-15)

Avail: NTIS HC A20/MF A01 CSCL 22B

Large space structures, system identification, model formulation, experimental design, model order and structure determination, parameter estimation, reduced order modeling, and closed loops are considered. Author

N83-26884*# Lockheed Missiles and Space Co., Palo Alto, Calif.
COMPUTER ANALYSIS AND GROUND TESTING OF LARGE SPACE SYSTEMS CONTROL STRATEGIES
J. N. Aubrun and J. A. Breakwell *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 2 May 1983 p 665-686 (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01 CSCL 22B

High and low authority control integration; analytical studies, test model, disturbance rejection, LSS control, Toysat experiment, control hardware, slim beam test, plate experiments, and truss experimental results are presented. Author

N83-26885*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SHAPE DETERMINATION/IDENTIFICATION FOR LARGE SPACE ANTENNAS
G. Rodriguez, J. M. Cameron, and M. H. Milman *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 2 May 1983 p 687-708 (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01 CSCL 22B

An integrated hardware/software system, SHADES, for shape determination and identification; a three dimensional multipoint sensor; multipoint sensor data; batch processing; and scanning algorithms are discussed. Author

N83-26886*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
PRACTICAL APPROACHES TO THE DESIGN OF CONTROL SYSTEMS FOR LARGE SPACE STRUCTURES
H. J. Buchanan *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 2 May 1983 p 709-719 refs (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01 CSCL 22B

Future space systems, flexible spacecraft, modular control, design-test-revise cycle, and control technique verification are discussed. Author

N83-26887*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RESULTS OF STUDIES AT LANGLEY RESEARCH CENTER ON THE CONTROL OF LARGE SPACE SYSTEMS
R. C. Montgomery and L. W. Taylor, Jr. *In its* Large Space Antenna Systems Technol., Pt. 2 May 1983 p 721-742 ref (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01

A control moment gyro, an integrated power/attitude control system, and distributed adaptive control are discussed. Author

N83-26888*# Hughes Aircraft Co., El Segundo, Calif. Space and Communications Group.
INTELSAT 6 ANTENNA SYSTEM DESIGN AND DEVELOPMENT
M. F. Caulfield, F. A. Taormina, B. M. Flynn, S. O. Lane, T. M. Paige, and V. E. Cascia *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 2 May 1983 p 743-765 refs (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01

An overview of INTELSAT VI is presented. Author

N83-26889*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SCANNING BEAM ANTENNA CONCEPTUAL DESIGN FOR 20/30 GHZ SATELLITE SYSTEMS
J. Smetana, R. Sorbello (Communications Satellite Corp., Clarksburg, Md.), and W. F. Crosswell (Harris Corp., Melbourne, Fla.) *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 2 May 1983 p 767-795 (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01

The configuration described is one of four antenna system configurations developed using a variety of monolithic microwave integrated circuit module arrangements and optical systems. A parametric analysis is expected to produce a data base for the selection of design points for a variety of applications. Soon to be accomplished is the design concept of the active (lens) array, which will take into consideration such factors as, coupling effects, the space-fed power divider network design, input bias and control layout, investigation of thermal distribution, and analysis of module failure (graceful degradation). L.F.M.

N83-26890*# European Space Agency, Noordwikj (Netherlands).
MULTIMISSION ADVANCED CONFIGURATION
A. Saitto and G. Berretta *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 2 May 1983 p 797-807 (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01 CSCL 22B

The proposed multimission configuration reduces the number of reflectors present on the spacecraft and their related supporting structure (masts, booms) and at the same time divides the feed system from the reflector system for possible maintenance and/or payload substitution. This implies: An antenna system that is split into two parts: (1) the reflector with the platform (2) the feed subsystem with the payload. Reuse of the same reflector at different frequencies (to achieve this, the reflector system will use additional components, i.e., frequency sensitive subreflectors (FSS)). In case of in-orbit refurbishment or maintenance, the reflector system may remain in orbit with the platform. The presence of the FSS allows separation of the focal position sufficiently for the multiple-contoured beam applications required by future missions. There are two of these reflectors (one for TX function, one for RV deployed) on the east and west sides of the spacecraft, and the solar panels are on the north and south sides. The payloads are aligned along the yaw axis. Apart from the size, this configuration looks like a conventional spacecraft. L.F.M.

N83-26891*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LARGE SPACE ANTENNA COMMUNICATIONS SYSTEMS: INTEGRATED LANGLEY RESEARCH CENTER/JET PROPULSION LABORATORY TECHNOLOGY DEVELOPMENT ACTIVITIES. 1: INTRODUCTION
Thomas G. Campbell *In its* Large Space Antenna Systems Technol., Pt. 2 May 1983 p 809-814 (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01 CSCL 22B

The Jet Propulsion Laboratory and the Langley Research Center have been developing technology related to large space antennas (LSA) during the past several years. The need for a communication system research program became apparent during the recent studies for the Land Mobile Satellite System. This study indicated the need for additional research in (1) electromagnetic analysis methods, (2) design and development of multiple beam feed systems, and (3) the measurement methods for LSA reflectors. L.F.M.

N83-26892*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LARGE SPACE ANTENNA COMMUNICATIONS SYSTEMS: INTEGRATED LANGLEY RESEARCH CENTER/JET PROPULSION LABORATORY DEVELOPMENT ACTIVITIES. 2: LANGLEY RESEARCH CENTER ACTIVITIES
T. G. Cambell, M. C. Bailey, C. R. Cockrell, and F. B. Beck *In its* Large Space Antenna Systems Technol., Pt. 2 May 1983 p 815-832 refs (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01 CSCL 22B

The electromagnetic analysis activities at the Langley Research Center are resulting in efficient and accurate analytical methods for predicting both far- and near-field radiation characteristics of large offset multiple-beam multiple-aperture mesh reflector antennas. The utilization of aperture integration augmented with

Geometrical Theory of Diffraction is analyzing the large reflector antenna system is emphasized. L.F.M.

N83-26893*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
LARGE SPACE ANTENNA COMMUNICATIONS SYSTEMS: INTEGRATED LANGLEY RESEARCH CENTER/JET PROPULSION LABORATORY DEVELOPMENT ACTIVITIES. 3: JET PROPULSION LABORATORY ACTIVITIES
K. E. Woo, Y. Rahmat-Samii, and W. Imbriale *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 2 May 1983 p 833-851 refs (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01 CSCL 22B

The portion of JPL antenna R/D work that is performed cooperatively with Langley Research Center in support of the demonstration and evaluation of the 15-m unfurlable antenna. The activities that will be performed during FY 83 and FY 84 are also indicated. L.F.M.

N83-26894*# Harris Corp., Melbourne, Fla.
THE EFFECTS OF MESH REFLECTING SURFACES UPON RADIOMETRIC MEASUREMENTS
W. F. Crosswell *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 2 May 1983 p 853-866 ref (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01 CSCL 20N

Reflector antennas with mesh surfaces have been used in ground and space applications primarily for communication systems. How the requirements for mesh surface reflectors are different for microwave radiometric applications is indicated, a method of measuring the anticipated small dissipation losses of gold-plated mesh using a radiometer system is proposed. L.F.M.

N83-26895*# North Carolina State Univ., Raleigh.
DEVELOPMENT OF IMPROVED ANALYTICAL MODELS FOR MESH REFLECTOR SURFACES
Jerry C. Brand and J. Frank Kauffman *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 2 May 1983 p 867-876 refs (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01 CSCL 22B

Several methods for computing the reflection coefficients from mesh surfaces are discussed. Some methods mentioned have severe limitations, and the spectral approach appears to be the most attractive alternative. In spite of some inherent problems, the solutions obtained with this method will offer not only the reflection coefficients but also the currents carried on the mesh. This would allow separation of the power lost to resistive terms from that due to transmission loss. Overall, good results and rapid convergence should be obtained from this method when proper care is applied. L.F.M.

N83-26896*# National Bureau of Standards, Boulder, Colo.
A SURVEY OF NEAR-FIELD TESTING METHODS FOR LARGE APERTURE ANTENNAS AND FUTURE TRENDS
Allen C. Newell *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 2 May 1983 p 877-897 (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01 CSCL 22B

In recent years, a near-field antenna measurements have progressed from theoretical concepts to a wide variety of operational measurement systems. The current status of this work is summarized and its possible application to large space antennas is discussed. L.F.M.

N83-26897*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
NEAR-FIELD MEASUREMENT FACILITY PLANS AT LEWIS RESEARCH CENTER
R. G. Sharp *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 2 May 1983 p 899-922 ref (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01 CSCL 20N

The direction of future antenna technology will be toward antennas which are large, both physically and electrically, will operate at frequencies up to 60 GHz, and are non-reciprocal and complex, implementing multiple-beam and scanning beam concepts and monolithic semiconductor devices and techniques. The acquisition of accurate antenna performance measurements is a critical part of the advanced antenna research program and represents a substantial antenna measurement technology challenge, considering the special characteristics of future spacecraft communications antennas. Comparison of various antenna testing techniques and their relative advantages and disadvantages shows that the near-field approach is necessary to meet immediate and long-term testing requirements. The LeRC facilities, the 22 ft x 22 ft horizontal antenna boresight planar scanner and the 60 ft x 60 ft vertical antenna boresight plant scanner (with a 60 GHz frequency and D/lamdba = 3000 electrical size capabilities), will meet future program testing requirements. L.F.M.

N83-26898*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THE NEED FOR SPACE FLIGHT EXPERIMENTS AND TESTING IN THE DEVELOPMENT OF LARGE SPACE ANTENNA SYSTEMS TECHNOLOGY
Earle K. Huckings, III *In its* Large Space Antenna Systems Technol., Pt. 2 May 1983 p 923-940 (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01 CSCL 22B

Flight experiments for large space antennas are discussed. A history of flight experimentation in the manned spacecraft program, space shuttle development, and planetary spacecraft is presented. Large space antenna systems are defined, and the needs for flight experiments justified. S.L.

N83-26899*# Grumman Aerospace Corp., Bethpage, N.Y.
A ROBOT IN SPACE AS A LARGE SPACE STRUCTURES CONTROL EXPERIMENT
Richard Gran *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 2 May 1983 p 941-947 ref (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01 CSCL 22B

The control systems design issues for large space structures can be addressed by a robotics experiment which defines a teleoperator or a robot or uses the RMS. The robotics control demonstration brings the large space structures control technology to an effective state of readiness and provides a useful robot when the experiment is finished. Three major options in such an experiment are the RMS, a flexible arm that is going to be put on the Shuttle for other reasons, or a dexetrous manipulator or teleoperator. S.L.

N83-26900*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
SPACE FLIGHT EXPERIENCE WITH THE SHUTTLE ORBITER CONTROL SYSTEM
Kenneth J. Cox, Kevin C. Daly, and Philip D. Hattis *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 2 May 1983 p 949-967 Prepared in cooperation with Draper (Charles Stark) Lab., Inc., Cambridge, Mass. (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01 CSCL 22B

Experience gained through the Shuttle Orbital Flight Test program has matured the engineering understanding of the Shuttle on-orbit control system. The geneology of the control systems (called digital autopilots, or DAPs, and used by the Shuttle for on-orbit operations) is reviewed, the flight experience gained during the flight test program is examined within the context of preflight analysis and test results, and issues for the operational phase of the Shuttle, including constraints upon both operations and analysis still required to increase confidence in the Shuttle's ability to handle capabilities not experienced during the flight test program are addressed. Two orbital autopilots have resulted from computer memory and time constraints on a flight control system, with many different, flight phase unique requirements. The transition

DAP, used for insertion and deorbit, has more active sensors and redundancy but a less complex data processing scheme excluding state estimation with fewer choices of operational mode. S.L.

N83-26901*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SPACE TECHNOLOGY EXPERIMENT PLATFORM (STEP). A SHUTTLE-BORNE SUPPORT FACILITY FOR STRUCTURES, STRUCTURAL DYNAMICS, AND CONTROL TECHNOLOGY FLIGHT EXPERIMENTS
Jack E. Harris and Larry D. Pinson *In its* Large Space Antenna Systems Technol., Pt. 2 May 1983 p 969-980 (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01 CSCL 22B

The Space Transportation System (STS) is used for technology experiments in space. The Space Technology Experiment Platform (STEP) is a Shuttle-borne experiment support facility for use by structures, structural dynamics, and controls technology flight experiments. STEP represents a key element in the commitment to STS utilization. The STEP concept and definition process is discussed, and the results obtained to date on the configuration and function capability are summarized, and preliminary schedule information is presented. S.L.

N83-26902*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SAFE ON-ORBIT EXPERIMENT FOR MEASUREMENT OF LARGE STRUCTURES DYNAMICS
R. W. Schock *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 2 May 1983 p 981-989 (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01 CSCL 22B

The Solar Array Flight Experiment (SAFE) on-orbit experiment for measurement of large structures dynamics consists of a dynamic sensing system designed to record and analyze the dynamic characteristics of the SAFE. The early availability of the SAFE and its basic large space structure characteristics make it a logical candidate for verification of the sensing system and the evaluation technique. The characteristics of the solar array which place it well within the generic class of large space structures are: (1) large size, (2) low natural frequencies, (3) mechanical complexity of its extendable/retractable mast, and (4) the inability to dynamically test in the Earth's atmosphere and in one g. The fourth characteristic is due to its size, air damping dominance of the blanket, and structural instability in one g. The specific characteristics of the solar array are shown and the applicability to large space structures is illustrated. S.L.

N83-26903*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SAFE II: LARGE SYSTEMS SPACE PLASMA EVALUATION EXPERIMENT
M. R. Carruth, Jr., L. E. Young, C. K. Purvis, and N. J. Stevens *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 2 May 1983 p 991-1006 refs Prepared in cooperation with NASA. Lewis Research Center (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01 CSCL 20I

A shuttle flight experiment, the purpose of which is to obtain space data on the interaction of a high voltage solar array with the ambient space plasma is addressed. This flight experiment is a reflight of the solar array flight experiment, SAFE, except that three active solar array panels, electron release devices and plasma diagnostics are added. This experiment, SAFE 2, evaluates power loss due to parasitic current collected by the solar array, arcing on the solar array and perturbations to the plasma which may increase power loss and disturb plasma and charged particle science acquisition. S.L.

N83-26904*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
MAST SPACE RESEARCH FLIGHT EXPERIMENT
John L. Allen and Brantley Hanks *In its* Large Space Antenna Systems Technol., Pt. 2 May 1983 p 1007-1019 (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01 CSCL 22B

The MAST flight experiments comprise a research program focusing on major LSS issues for which it is deemed necessary to test, measure, and validate techniques and concepts in the space environment. The MAST Shuttle attached test articles are transported to space by the STEP experiment carrier and are copatible with STEP interfaces in all configurations. As the experiments require no particular orbit and the operational timeliness needed for mission performance are not extensive, it is forseen that the STEP/MAST combination could provide an attractive repetitive element within the Shuttle mixed cargo manifesting process. Using the STEP experiment carrier and a retractable reusable test article allows repetitive flight research to the extent that the STEP is able to be manifested on a regular basis. Since this research program examines generic phenomena, maximum emphasis is placed upon information quality and the fidelity with which the phenomena model emulates the LSS issue. S.L.

N83-26905*# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
A LARGE ANTENNA SYSTEM FLIGHT EXPERIMENT
Keto Soosaar *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 2 May 1983 p 1021-1027 (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01 CSCL 22B

The design and development of large antenna systems are discussed. The validation objectives and techniques of the structural behavior of the system are outlined along with studies of the dynamics, deployment, and unpacking. The validation of flexible control and system performance are also considered. S.L.

N83-26906*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SADE: A SPACE EXPERIMENT TO DEMONSTRATE STRUCTURAL ASSEMBLY
James K. Harrison and David C. Cramblit *In* NASA. Langley Research Center Large Space Antenna Systems Technol., Pt. 2 May 1983 p 1027-1036 (For primary document see N83-26879 16-15)
Avail: NTIS HC A20/MF A01 CSCL 22B

The Structural Assembly and Demonstration Experiment (SADE) demonstrates that the Shuttle is a suitable base for space construction; this includes a test of the Shuttle's control system to determine its performance when a long attached truss or beam is extended from the bay. Examples of Shuttle-related systems that will receive special attention are the RMS, the lighting system, and the crew assembly capabilities. A second purpose is to determine the extent to which the assembly results from the Neutral Buoyancy Simulator can be used to forecast the results of space assembly is determined. Finally, the SADE truss design will be validated by measuring the performance of the deployment, the special connectors, and the assembly methods. S.L.

N83-26907# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
ESTIMATION OF LAUNCH VEHICLE PERFORMANCE PARAMETERS FROM 2 ORBITING SENSORS M.S. Thesis
Donald W. Gross Dec. 1982 83 p refs
(AD-A124802; AFIT/GA/AA/82D-4) Avail: NTIS HC A05/MF A01 CSCL 12/1

A technique was developed for estimation of launch vehicle performance parameters. This technique used an inverse covariance or Bayes filter. Both a seven state and an eight state dynamics model were implemented and their performance investigated. Observations consisted of angular, infrared measurements from two orbital sensors. The seven state filter had 3 position, 3 velocity and an acceleration component for its state vector. The acceleration state was modelled as constant between measurement updates. After the addition of a fading memory, the seven state filter showed good performance in estimating a variable acceleration profile. The eight state filter had 3 states each for position and velocity, and seventh and eighth states involving engine exit

velocity and propellant mass flow rate. Although the eight state filter had a better model for the acceleration, the filter proved to be unsuccessful in its estimation attempts. Author (GRA)

N83-26908# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
AN EXPERIMENTAL ANALYSIS IN MODERN MODAL CONTROL M.S. Thesis
George Frederick Studor, Jr. Dec. 1982 95 p refs
(AD-A124839; AFIT/GA/AA/82D-11) Avail: NTIS HC A05/MF A01 CSCL 22/2

Experimental demonstration of modern modal control of a flexible clamped-clamped beam in bending was accomplished. Pole placement techniques in conjuction with a Leuenberger Observer were used for controller development. Available microcomputer computational capabilities drove the reduced order model to a two mode representation. The controllers, designed with varying degrees of robustness, demonstrated the limitations of reduced order controllers in even the simplest of systems. Sensor and actuator position are demonstrated to be of paramount importance in the modern controller LQ design. GRA

N83-26909# Naval Postgraduate School, Monterey, Calif. Dept. of Administrative Sciences.
COST ANALYSIS OF NAVY ACQUISITION ALTERNATIVES FOR THE NAVSTAR GLOBAL POSITIONING SYSTEM M.S. Thesis
Thomas F. Darcy and Gary P. Smith Dec. 1982 181 p refs
(AD-A125017) Avail: NTIS HC A09/MF A01 CSCL 05/1

This research analyzes the life cycle cost (LCC) of the Navy's current and two hypothetical procurement alternatives for NAVSTAR Global Positioning System (GPS) user equipment. Costs are derived by the ARINC Research Corporation ACBEN cost estimating system. Data presentation is in a comparative format describing individual alternative LCC and differential costs between alternatives. Sensitivity analysis explores the impact receiver-processor unit (RPU) first unit production cost has on individual alternative LCC, as well as cost differentials between each alternative. Several benefits are discussed that might provide sufficient cost savings and/or system effectiveness improvements to warrant a procurement strategy other than the existing proposal. Author (GRA)

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

N83-26910*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
EVALUATION OF MOUNTING BOLT LOADS FOR SPACE SHUTTLE GET AWAY SPECIAL (GAS) ADAPTER BEAM
Dipak C. Talapatra Feb. 1983 39 p refs
(NASA-TM-84988; NAS 1.15:84988) Avail: NTIS HC A03/MF A01 CSCL 22B

During the prototype vibration tests of the GAS adapter beam, significant impacting of the beam at its support points was observed. The cause of the impacting was traced to gaps under the mounting bolt heads. Because of the nonlinear nature of the response, it was difficult to evaluate the effects which Shuttle launch dynamics might have on the mounting bolt loads. A series of tests were conducted on an electrodynamic exciter in which the transient acceleration time histories, which had been measured during the Space Transportation System-1 (STS-1; Space Shuttle mission 1) launch, were simulated. The actual flight data had to be filtered and compensated so that it could be reproduced on the shaker without exceeding displacement and velocity limitations. Mounting bolt loads were measured directly by strain gages applied to the bolts. Various gap thicknesses and bolt torques were investigated. Although increased gap thickness resulted in greater accelerations due to impacting, the bolt loads were not significantly affected. This is attributed to the fact that impacting excited mostly higher frequency modes which do not have significant modal mass. Author

N83-26911*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ANALYSIS OF STS-3 GET AWAY SPECIAL (GAS) FLIGHT DATA AND VIBRATION SPECIFICATION FOR GAS PAYLOADS
Dipak C. Talapatra Mar. 1983 33 p refs
(NASA-TM-85000; NAS 1.15:85000) Avail: NTIS HC A03/MF A01 CSCL 22A

During the Space Transportation System (STS)-3 mission, a Get Away Special (GAS) canister was flown. In order to determine the flight environment for GAS payloads, triaxial accelerometers and a microphone were installed inside the GAS canister. Data from these accelerometers and the microphone were analyzed. The microphone data is presented as overall sound pressure level (SPL) and one-third octave band time history plots. And the accelerometer data is provided in the forms of instantaneous time history, RMS time history and power spectral density plots. Also based on this flight data, vibration test specification for GAS payloads was developed and the recommended specification is presented here. Author

N83-26912*# National Aeronautics and Space Administration, Washington, D. C.
AMBITIOUS STS-7 MISSION TO FEATURE FIRST LANDING AT KENNEDY
David Garrett, Mark Hess, Terry White, and John Taylor Jun. 1982. 71 p
(NASA-News-Release-83-87; P83-10098) Avail: NASA Scientific and Technical Information Facility, P. O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 22A

The STS-7 press briefing schedule, NASA select television schedule; launch preparations, countdown and liftoff; major countdown milestones; launch window; STS-7 flight sequence of events, landing timeline; STS-7 flight timeline; landing and post landing operations; flight objectives; Telesat's ANIK-C 2; PALAPA-B; STS-7 experiments; and spacecraft tracking and data network are presented. Author

N83-26913# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
OPTIMIZING THE SPACE TRANSPORTATION SYSTEM M.S. Thesis. Final Report
Jess M. Sponable Dec. 1982 164 p refs
(AD-A124920; AFIT/GA/AA/82D-10) Avail: NTIS HC A08/MF A01 CSCL 22/2

This study examines a scenario for bolstering the operational control exercised over the U.S. satellite fleet. An Extended Space Transportation System (STS) composed of a Shuttle, Space Station, and Orbital Transfer Vehicle (OTV) is analysed using a nonlinear optimization technique. The OTV deploys a postulated fleet of military satellites across the entire gamut of inclinations and altitudes. The use of both chemically and ion propelled OTVs are evaluated. Applying a vector optimization process to the latter simultaneously minimizes both the average OTV mission duration and annual Shuttle launches. The resulting efficient operating frontier specifies a series of optimal inclinations, altitudes and OTV sizes at which the system should be operated. Total Shuttle launch rates for the Extended STS are significantly less than for direct orbital insertion of satellites with the Shuttle. Equally important, the ion propelled OTV satellite deployment times are probably fast enough to satisfy the military requirement of rapid deployment. Author (GRA)

N83-26914# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
BODY FLAP HEAT TRANSFER DATA FROM SPACE SHUTTLE ORBITER ENTRY FLIGHT TEST MANEUVERS M.S. Thesis
John Robert Wood Dec. 1982 89 p refs
(AD-A124844; AFIT/GA/AA/82D-12) Avail: NTIS

HC A05/MF A01 CSCL 22/2

The Space Shuttle Orbiter has conducted various flight test maneuvers during the Orbital Flight Test Program and beyond in order to establish heating rates at various angles of attack and center of gravity positions. The objective of this project was to investigate the heating effects on the body flap during the entry flight test maneuvers and determine the limits on the flap deflections for an aft center of gravity envelope on the Orbiter. An analysis program available from the Air Force Flight Test Center AFFTC) uses applicable simulation equations for the aerodynamic performance of the TPS in their flight simulator and data reduction program (HEATSET). The approach was to use the HEATSET program to determine the heating an one critical point on the body flap during the STS-2 entry flight test inputs (Flap Thermocouple V07T9508). From these results and other results on the outboard elevons, the maximum flap deflection angle and Orbiter aft center of gravity could be established. Author (GRA)

N83-26915# Calspan Field Services, Inc., Arnold Air Force Station, Tenn.

INTEGRATED AERODYNAMIC TESTS OF THE SPACE SHUTTLE VEHICLE DURING SOLID ROCKET BOOSTER SEPARATION AT MACH 4.5 (IA193) Final Report, 9-31 Mar. 1982

W. A. Crosby and D. D. Lanham AEDC Jun. 1982 68 p refs (AD-A125297; AEDC-TSR-82-V15) Avail: NTIS HC A04/MF A01 CSCL 22/2

Static force and moment tests were conducted in the VKF Tunnel A using the captive trajectory system to simulate solid rocket booster (SRB) separation maneuvers from the space shuttle orbiter/external tank at Mach 4.5. Phase I test objectives were to determine proximity interference aerodynamics of the SRBs with the booster motors active. The Phase II effort developed an expanded aerodynamic data base, up to longitudinal separation distances of 1700 in., with a single SRB and no motor modeling. Limited testing was accomplished at Mach 4.0 to determine Mach number effect. These tests are identified by NASA as IA193.

Author (GRA)

N83-26916# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

NUMERICAL COMPUTATION OF THE MATRIX RICCATI EQUATION FOR HEAT PROPAGATION DURING SPACE SHUTTLE REENTRY M.S. Thesis

Phillip Wayne Sagstetter Dec. 1982 103 p refs (AD-A124873; AFIT/GCS/MA/82D-7) Avail: NTIS HC A06/MF A01

A computer program named HEATEST required excessive computer time to evaluate the matrix Riccati equation for temperature covariance. Alternative numerical methods were employed to compute the Riccati equation, and the HEATEST program execution time was reduced by 70%. However, cumulative temperature covariance rose from 2.45 to 3.28 degrees. This rise was considered insignificant. A survey was conducted of methods for computing the matrix exponential. A triangular matrix decomposition method proved to be more efficient than summing the Taylor series, especially for matrices with a large condition number. This substitution produced an overall 10% decrease in HEATEST execution time with comparable accuracy. Simpson's Rule was used to evaluate the matrix Riccati integral term. The accuracy of this method was in the range of 5 to 9 significant digits, and computation time for the integral term was reduced by 90% for a matrix of order 13. This substitution prompted the rise in the covariance. FORTRAN program modules and numerical examples are included. Author (GRA)

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

N83-26917# Sandia Labs., Albuquerque, N. Mex. TM Advanced Development Div.

PERFORMANCE OPTIMIZATION OF PCM/SCO TELEMETRY SYSTEMS

Harold O. Jeske Apr. 1982 19 p (Contract DE-AC04-76DP-00789) (DE82-015797; SAND-81-2531) Avail: NTIS HC A02/MF A01

These hybrid TM system design procedures indicate how PCM channel performance comparable with that obtainable from an optimally designed PCM/FM transmission system may be obtained even though numerous subcarrier channels are included in the system. Optimal design goals are those that permit satisfactory telemetry system operation with a minimum of transmitted power. By careful control of the transmitter modulation levels and the use of predetection filtering during playback, a lowering of the PCM channel's threshold, equivalent to at least quadrupling the transmitter power over conventional practices, is obtained. This report briefly discusses the design objectives of FM/FM and PCM/FM systems followed by a more detailed discussion of hybrid systems using FM subcarriers above the PCM signal on the baseband. A simplified, but comprehensive, discussion of FM sidebands is presented in the appendixes to aid in understanding the limits and restrictions in this hybrid TM system design procedure. DOE

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

N83-26918*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

AERODYNAMIC CHARACTERISTICS OF GENERALIZED BENT BICONIC BODIES FOR AERO-ASSISTED, ORBITAL-TRANSFER VEHICLES

Carol B. Davies (Informatics General Corp., Palo Alto, Calif.) and Chul Park Apr. 1983 18 p refs (NASA-TM-84362; A-9281; NAS 1.15:84362) Avail: NTIS HC A02/MF A01 CSCL 22B

A method was developed to generate the surface coordinates of body shapes suitable for aeroassisted, orbital-transfer vehicles (AOTVs) by extending bent biconic geometries. Lift, drag, and longitudinal moments were calculated for the bodies using Newtonian flow theory. These techniques were applied to symmetric and asymmetric aerobraking vehicles, and to an aeromaneuvering vehicle with high L/D. Results for aerobraking applications indicate that a 70 deg, fore half cone angle with a spherically blunted nose, rounded edges, and a slight asymmetry would be appropriate. Moreover, results show that an aeromaneuvering vehicle with L/D $>$ 2.0, and with sufficient stability, is feasible.

Author

N83-26919*# Rockwell International Corp., Downey, Calif. Space Operations/Integration and Satellite Systems Div.

DEVELOPMENT OF DEPLOYABLE STRUCTURES FOR LARGE SPACE PLATFORM SYSTEMS, VOLUME 1 Interim Report

Aug. 1982 185 p refs

(Contract NAS8-34677)
(NASA-CR-170689; NAS 1.26:170689; SSD-82-0121-1) Avail: NTIS HC A09/MF A01 CSCL 22B

Generic deployable spacecraft configurations and deployable platform systems concepts were identified. Sizing, building block concepts, orbiter packaging, thermal analysis, cost analysis, and mass properties analysis as related to platform systems integration are considered. Technology needs are examined and the major criteria used in concept selection are delineated. Requirements for deployable habitat modules, tunnels, and OTV hangars are considered. A.R.H.

N83-26920*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
AUTONOMOUS SPACECRAFT DESIGN AND VALIDATION METHODOLOGY HANDBOOK Interim Report
Philip R. Turner 30 Apr. 1982 577 p refs Prepared for AFSC, Edwards AFB, Calif.
(Contract NAS7-100)
(NASA-CR-172678; JPL-7030-4; NAS 1.26:172678; AD-A120522; SD-TR-82-58) Avail: NTIS HC A25/MF A01 CSCL 22B

This Handbook provides reference material pertaining to the design and validation of autonomous spacecraft systems. The goal is to present in one place a compendium of rules, considerations, and approaches to spacecraft autonomy that will be useful to Air Force and Industrial personnel involved in project management, design, implementation, test, and operations of military space systems. The scope of the content ranges from mission level requirements definition to examples of techniques used to implement subsystem level autonomous control. An attempt has been made to summarize and document the spacecraft autonomy approaches that JPL utilized in their planetary spacecraft designs over the past decade, and to reorient these approaches to the extent necessary to make them applicable to defense satellites. GRA

N83-26921*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
TECHNOLOGY NEEDS FOR AIR FORCE AUTONOMOUS SPACECRAFT Interim Report
John R. Scull 16 Mar. 1982 61 p refs Prepared for AFSC, Edwards AFB, Calif.
(Contract NAS7-100)
(NASA-CR-172677; Rept-7030-3/JPL-D-1488; NAS 1.26:172677; AD-A120492; SD-TR-82-50) Avail: NTIS HC A04/MF A01 CSCL 22B

This volume presents an assessment of the technology needs for achieving autonomous operation of Air Force spacecraft. The technologies identified were selected based on autonomy goals, mission drivers, and a technology forecast. The assessment concluded that near term autonomy goals could be met by using current technology supplemented by certain key developments such as autonomous system methodology, fault-tolerant computers, autonomous navigation, and reliable mass data storage. GRA

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

No abstracts in this category.

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N83-26922*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
AUXILIARY PROPULSION REQUIREMENTS FOR LARGE SPACE SYSTEMS
Joseph E. Maloy, William W. Smith (Boeing Aerospace, Seattle, Wash.), and Gary W. Machles (Boeing Aerospace, Seattle, Wash.) 1983 23 p refs Presented at the 19th Joint Propulsion Conf. and Tech. Display, Seattle, 27-29 Jun. 1983; sponsored by the AIAA, SAE and ASME
(NASA-TM-83388; E-1666; NAS 1.15:83388; AIAA-83-1217) Avail: NTIS HC A02/MF A01 CSCL 21H

An insight into auxiliary propulsion systems (APS) requirements for large space systems (LSS) launchable by a single shuttle is presented. In an effort to scope the APS requirements for LSS, a set of generic LSSs were defined. For each generic LSS class a specific structural configuration, representative of that most likely to serve the needs of the 1980's and 1990's was defined. The environmental disturbance forces and torques which would be acting on each specific structural configuration in LEO and GEO orbits were then determined. Auxiliary propulsion requirements were determined as a function of: generic class specific configuration, size and openness of structure, orbit, angle of orientation, correction frequency, duty cycle, number and location of thrusters and direction of thrusters and APS/LSS interactions. The results of this analysis were used to define the APS characteristics of: (1) number and distribution of thrusters, (2) thruster modulation, (3) thrust level, (4) mission energy requirements, (5) total APS mass component breakdown, and (6) state of the art adequacy/deficiency. S.L.

N83-26923*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THE PERFORMANCE AND APPLICATION OF HIGH SPEED LONG LIFE LH2 HYBRID BEARINGS FOR REUSABLE ROCKET ENGINE TURBOMACHINERY
N. P. Hannum and C. E. Nielson (Rockwell International, Canoga Park, Calif.) 1983 27 p refs Presented at the 19th Joint Propulsion Conf., Seattle, 27-29 Jun. 1983; sponsored by AIAA, SAE and ASME
(NASA-TM-84317; E-1707; NAS 1.15:84317; AIAA-83-1389) Avail: NTIS HC A03/MF A01 CSCL 21H

Data are presented for two different experimental programs which were conducted to investigate the characteristics of a hybrid (hydrostatic/ball) bearing operating in liquid hydrogen. The same bearing design was used in both programs. Analytical predictions were made of the bearing characteristics and are compared with the experimental results when possible. The first program used a bearing tester to determine the steady state, transient, and cyclic life characteristics of the bearing over a wide range of operating conditions. The second program demonstrated the feasibility of applying hybrid bearings to an actual high speed turbopump by retrofitting and then testing an existing liquid hydrogen turbopump with the bearings. Author

N83-26924*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ADVANCED PROPULSION CONCEPTS FOR ORBITAL TRANSFER VEHICLES
L. P. Cooper [1982] 15 p refs Prepared for Presentation at the 19th Joint Propulsion Conf., Seattle, Wash., 27-29 Jun. 1983; sponsored by AIAA, SAE, and ASME
(NASA-TM-83419; E-1709; NAS 1.15:83419) Avail: NTIS HC A02/MF A01 CSCL 21H

Studies of the United States Space Transportation System show that in the mid-to-late 1990s expanded capabilities for Orbital Transfer Vehicles (OTV) will be needed to meet increased payload requirements for transporting materials and possible men to geosynchronous orbit. NASA is conducting a technology program in support of an advanced propulsion system for future OTVs. This program is briefly described with results to date of the first program element, the Conceptual Design and Technology Definition studies. Author

N83-26925# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
AERONAUTICAL KNOWLEDGE (SELECTED ARTICLES)
17 Dec. 1982 12 p Transl. into ENGLISH from Hangkong Zhishi (China), no. 3, Mar. 1982 p 12-13
(AD-A123935; FTD-ID(RS)T-1228-82) Avail: NTIS HC A02/MF A01 CSCL 21/8

The development and successful flight tests of electron rockets and plasma power plants by the Chinese are described. For individual titles, see N83-26926 through N83-26927.

N83-26926# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
FIRST FLIGHT TEST OF CHINESE ELECTRON ROCKET IS SUCCESSFUL
In its Aeronautical Knowledge (Selected Articles) (FTD-ID(RS)T-1228-82) 17 Dec. 1982 p 1-2 Transl. into ENGLISH from Hangkong Zhishi (China), no. 3, Mar. 1982 (For primary document see N83-26925 16-20)
Avail: NTIS HC A02/MF A01 CSCL 21/8

A Chinese developed electron rocket recently carried out a successful space flight. The electron rocket features low thrust, high specific impulse, long service life, rapid actuation, and maneuverable control. It is suitable for attitude control and orbital corrections of various types of satellites and spacecraft. Author

N83-26927# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE PLASMA POWERPLANT
Song Yuyang *In its* Aeronautical Knowledge (Selected Articles) (FTD-ID(RS)T-1228-82) 17 Dec. 1982 p 3-8 Transl. into ENGLISH from Hangkong Zhishi (China), no. 3, Mar. 1982 (For primary document see N83-26925 16-20)
Avail: NTIS HC A02/MF A01 CSCL 21/8

A plasma power plant consists of two main components: the plasma engine and the power unit. The former produces reactive thrust, and the latter supplies electrical energy. Plasma engines have the following characteristics: high specific impulse, low thrust, long operating time, can be started many times, low efficiency, and a thrust to weight ratio of less than 1. Plasma engines are divided into two major types according to the difference in functional principles: continuous and pulse. Author

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

No abstracts in this category.

24 COMPOSITE MATERIALS

Includes laminates.

N83-26928*# Boeing Military Airplane Development, Seattle, Wash. Advanced Airplane Branch.
COMPRESSION AND COMPRESSION FATIGUE TESTING OF COMPOSITE LAMINATES Final Report, 1 Jun. 1981 - 31 Aug. 1982
T. R. Porter [1982] 135 p refs
(Contract NAS3-22812)
(NASA-CR-168023; NAS 1.26:168023; D180-27619-1) Avail: NTIS HC A07/MF A01 CSCL 11D

The effects of moisture and temperature on the fatigue and fracture response of composite laminates under compression loads were investigated. The structural laminates studied were an intermediate stiffness graphite-epoxy composite (a typical angle ply laimna liminate had a typical fan blade laminate). Full and half penetration slits and impact delaminations were the defects examined. Results are presented which show the effects of moisture on the fracture and fatigue strength at room temperature, 394 K (250 F), and 422 K (300 F). Static tests results show the effects of defect size and type on the compression-fracture strength under moisture and thermal environments. The cyclic tests results compare the fatigue lives and residual compression strength under compression only and under tension-compression fatigue loading. A.R.H.

N83-26929# Ohio State Univ., Columbus.
TRANSIENT HEAT FLOW ALONG UNI-DIRECTIONAL FIBERS IN COMPOSITES Final Report, 1 Jul. 1978 - 31 Dec. 1981
Lit S. Han Wright-Patterson AFB, Ohio AFWAL Dec. 1982 147 p
(Grant AF-AFOSR-3640-78; AF Proj. 2307)
(AD-A122926; AFWAL-TR-82-3061; Rept-761108/711129) Avail: NTIS HC A07/MF A01 CSCL 11/4

For uni-directional fibrous composites and laminated composites, a heat balance integral method has been developed for the analysis of transient heat flow along the fibers or in the plane of laminates. The method is based on the construction of, for the two constituent media, temperature profiles which not only satisfy the necessary boundary conditions but also fulfill the asymptotic error function properties when inter-region conduction is vanishingly small or at very early times of the heat transient. By comparing with the results of exact solutions, accuracy of the method has been established to be dependent on a number of factors especially the inter-face conduction coefficient and thermal capacity ratio. For the case of a constant surface heat flux, a relevant engineering problem, surface temperature rises of the two regions may be quite different from each other. Temperature differences, however, diminish quite rapidly toward the interior and are only confined to a depth equal to a few fiber radii or laminate thicknesses. Author

N83-26930# California Univ., Livermore. Lawrence Livermore Lab.
NONDESTRUCTIVE INSPECTION AND EVALUATION OF COMPOSITE-MATERIAL FLYWHEELS
K. L. Reifsnider, D. M. Boyd, and Satish V. Kulkarni 24 Feb. 1982 32 p refs 2 Vol.
(Contract W-7405-eng-48)
(DE82-015379; UCRL-53264-Vol-2) Avail: NTIS HC A03/MF A01

Flywheels made from composite materials are capable of storing energy with a significantly higher energy density than those made from conventional metals. Since composite materials are also very durable and inherently safer for such applications, it appears that they will play a major role in flywheel energy storage systems. Flywheels made from composite materials are inspected with nondestructive test methods to establish their initial quality and their subsequent integrity during service. A variety of methods is discussed in the context of special requirements for the examination of composite flywheel structures and the results of several example nondestructive evaluations before and after spin testing are presented. Recommendations for general nondestructive testing and evaluation of composite material flywheels are made. DOE

N83-26931# California Univ., Livermore. Lawrence Livermore Lab.
POTENTIAL OF COMPOSITE MATERIALS IN SURFACE TRANSPORTATION APPLICATIONS

Satish V. Kulkarni 16 Dec. 1982 49 p
(Contract W-7405-eng-48)
(DE83-007218; UCRL-53351) Avail: NTIS HC A03/MF A01

The different issues associated with materials substitution with fiber reinforced composites in surface transportation vehicles were addressed and pertinent high risk R and D areas having payoff in the far term were identified. Initially, a brief summary of the various materials and processes, and prototype development programs is presented. Subsequently, factors inhibiting the use of composites are listed and finally, future R and D areas are delineated. No attempt was made to perform an exhaustive study and cover every aspect and activity in this technology area. This is due primarily to the limited scope of this effort and to the vastness of the field. DOE

N83-26932# Rockwell International Corp., Thousand Oaks, Calif. Science Center.
SINTERING PHENOMENA OF NON-OXIDE SILICON COMPOUNDS Technical Report, 1 Jan. - 31 Dec. 1982
D. R. Clarke and T. M. Shaw Jan. 1983 83 p refs
(Contract DE-AC03-78ER-01885)
(DE83-007332; DOE/ER-01885/5; SC5178.TR4; TR-4) Avail: NTIS HC A05/MF A01

The technical progress made in an investigation of factors that influence the liquid phase sintering and microstructural development of silicon nitride based materials is described. The development of new powder processing routes to prepare homogeneous precursor powder compacts for the fabrication of silicon nitride materials was discussed. This is seen as the first step towards optimizing the properties of silicon nitride materials by improving their microstructural homogeneity. Through the careful control of each stage of processing, additive containing silicon nitride powder compacts of exceptional homogeneity were produced. In addition a theoretical study of the effect of powder packing on microstructural uniformity was undertaken in an effort to understand how inhomogeneities might arise during the liquid phase sintering of silicon nitride ceramics. A detailed transmission electron microscopy study of the microstructure of chemical vapor deposition (CVD) silicon nitride materials was also conducted. DOE

N83-26933# Lulea Univ. (Sweden). Dept. of Engineering Materials.
FIBER REINFORCED COMPOSITE MATERIALS
Erik Navara and Kenneth E. Easterling 1981 27 p refs
(TULEA-1981-02; ISSN-0347-0881) Avail: NTIS HC A03/MF A01

Fiber reinforced material technology is reviewed. Fiber properties and selection, requirements on the matrix materials, fracture and rupture of composites, metal-matrix composites and polymer matrix-composites are discussed. Application examples are given including the use of carbon fiber reinforced plastics in military aircraft such as the Viggen and the B3LA, and the potential application to automobile manufacture where the use of 300 kg of crack fiber reinforced plastics can reduce overall weight by 600 kg. Author (ESA)

N83-26934# ECON, Inc., Princeton, N. J.
STATUS, TRENDS AND IMPLICATIONS OF CARBON FIBER MATERIAL USE Final Report, 20 Sep. 1979 - 19 Sep. 1981
Dec. 1982 160 p refs
(Contract EPA-68-03-2857)
(PB83-147751; EPA-600/2-82-103) Avail: NTIS HC A08/MF A01 CSCL 11D

The future usage of carbon fiber composite materials in both consumer and industrial products, and the resultant economic impact of the disposal of these products and industrial scrap in both the municipal and industrial waste streams are estimated. The technical and economic substitutability of carbon fiber composite materials for materials now in use is analyzed, and the major uses of this material forecasted. Potential problems relating to the disposal of products containing carbon fiber materials are analyzed, and estimates made of the economic impacts of the disposal of these products for alternative scenarios that cover a wide range of disposal technologies. The economic impact of the disposal of products and industrial scrap containing carbon fiber composite materials is found to be insignificant for all of the scenarios investigated. GRA

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N83-26935# British Gas Corp., London (England).
CHROMATOGRAPHY OF COAL DERIVED OIL
K. G. Liphard, M. Gade, K. Handrick, B. Strobel, W. Riepe, and G. Koelling 7 Dec. 1982 11 p refs Transl. into ENGLISH from Erdoel Kohle, Erdgas, Petrochem. (West Germany), v. 34, no. 11, Nov. 1981 p 486-491
(BLL-T5991/BG/MRA14684/82) Avail: British Library Lending Div., Boston Spa, Engl.

Coal liquids are most complex mixtures, therefore, preparations are essential for analysis. A separation scheme for both light and middle oil is presented. Phenols and bases are separated by liquid extraction using NaOH and H_2SO_4 respectively. These polar compounds are characterized further by capillary gas chromatography. The remaining neutral oils are divided into hydrocarbon type groups using a high performance liquid chromatography (HPLC) technique. Coal liquids from different coals can easily be compared by this method. The separation by HPLC can also be made on a preparative scale. Fractions containing distinct hydrocarbons groups are obtained for further analysis, for example by gas chromatography. Some Typical chromatography are presented. S.L.

N83-26936*# Texas Univ., Austin. Dept. of Chemistry.
PREPARATION, CHARACTERIZATION, PHYSICAL TESTING AND PERFORMANCE OF FLUOROCARBON MEMBRANES AND SEPARATORS Final Report
Richard J. Lagow and Earl T. Dumitru Feb. 1982 24 p refs
(Grant NsG-3190)
(NASA-CR-167880; NAS 1.26:167880) Avail: NTIS HC A02/MF A01 CSCL 07D

The direct fluorination method of converting carefully selected hydrocarbon substrates to fluorinated membranes was successfully applied to produce promising, novel membranes for electrochemical devices. A family of polymer blends was identified which permits wide latitude in the concentration of both crosslinks and carboxyl groups in hydrocarbon membranes. These membranes were successfully fluorinated and are potentially competitive with commercial membranes in performance, and potentially much cheaper in price. Author

N83-26937# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
FLAME OPTIMIZATION FOR THE SPECTROSCOPIC ANALYSIS OF THE CHEMILUMINESCENCE FROM LEAD OXIDE M.S. Thesis
John Warren Glessner Dec. 1982 113 p refs
(AD-A124825; AFIT/GEP-PH-82D-9) Avail: NTIS HC A06/MF A01 CSCL 09/2

A flow tube reactor was used to produce a chemiluminescent flame by the reaction of lead vapor with oxygen. The flow tube geometry, furnace design, and reactant mixing were optimized to produce maximum flame emission for extended periods of time. Reaction chemistry was found to be sensitive to specific reactant mixing technique. A mass balance of 98% allowed the flux of lead into the reaction area to be determined to be approximately 3 x 10 to the 18th power atoms/sq cm sec. The lead oxide chemiluminescent flame, whose temperature was measured to be

175 C, was spectroscopically analyzed using a Jarrel-Ash 0.5 m Monochrometer with a photomultiplier tube detector. Measurements of the B-X, A-X, and a-X transitions led to the determination of the spectroscopic constants. M.G.

N83-26938# Army Armament Research and Development Command, Aberdeen Proving Ground, Md. Ballistic Research Lab.
SENSITIVITY ANALYSIS FOR PREMIXED, LAMINAR, STEADY-STATE FLAMES
Terence P. Coffee and Joseph M. Heimerl Jan. 1983 67 p refs
(DA Proj. 1L1-62618-AH-80)
(AD-A123866; AD-F300166; ARBRL-TR-02457) Avail: NTIS HC A04/MF A01 CSCL 21/2

A procedure has been developed to perform a sensitivity analysis on the transport and rate input parameters for a premixed, laminar, one dimensional, steady-state flame. Computer codes exist to perform the sensitivity analysis automatically. The analysis can be done in terms of Taylor expansions or Logarithmic expansions. Both first and second order coefficients may be computed. As a test case, the analysis has been carried out for a set of H2/O2/N2/ flames. The relative accuracy and the range of validity of the various expansions is discussed. GRA

N83-26939# Naval Research Lab., Washington, D. C. Lab. for Computational Physics.
IGNITION OF FLAMELETS BEHIND INCIDENT SHOCK WAVES AND THE TRANSITION TO DETONATION
K. Kailasanath (Science Applications, Inc., McLean, Va.) and E. S. Cran 7 Mar. 1983 33 p refs
(AD-A125217; NRL-MR-5030) Avail: NTIS HC A03/MF A01 CSCL 21/2

Time-dependent numerical simulations are used to elucidate some of the details of weak ignition behind incident shocks and the subsequent transition to detonation. It is shown that a small amount of energy released in the shocked region can be the origin of pressure waves which accelerate the shock front. The simulations presented here show how this leads to the formation of reactive centers. The formation of a hot spot due to energy release at one of the reactive centers and the subsequent development of a pair of flamelets from the hot spot are studied using the numerical simulations. The results of the simulations are also compared to experimental observations. GRA

N83-26940# Defence Research Establishment Suffield, Ralston (Alberta).
A METHOD FOR DETERMINING LIQUID VOLATILITY AT AMBIENT TEMPERATURES USING AN INFRARED GAS ANALYZER
Christopher G. Martin, John M. McAndless, and Claude L. Chenier Jul. 1982 31 p refs
(AD-A124906; DRES-340) Avail: NTIS HC A03/MF A01 CSCL 14/2

A method is described for directly measuring liquid volatility at ambient temperatures without the need to measure vapour pressure or use a predictive vapour pressure-temperature relationship. The method is based on the drying of a wetted substrate under controlled conditions and relating the rate of drying to liquid volatility. The rate of drying is determined by monitoring changes in vapour concentration over time using an infrared gas analyzer. Author (GRA)

N83-26941# California Univ., San Diego. Dept. of Chemistry.
MOLECULAR DYNAMICS OF CHEMICAL REACTIONS IN SOLUTION
Phillipe Bado, Peter H. Berens, John P. Bergsma, Mark H. Coladonato, and Charles G. Dupuy Oct. 1983 18 p refs
(Contract N00014-78-C-0325)
(AD-A124953) Avail: NTIS HC A02/MF A01 CSCL 07/4

We hope to answer one of the most fundamental and important unsolved questions in chemistry: how, from a molecular perspective, do chemical reactions in solution actually occur. The key to solving this long-standing problem is to understand the molecular dynamics, i.e. the motions of the atoms and the forces that drive them. We have already developed theoretical techniques and computational procedures involving specialized computer hardware needed to calculate the molecular dynamics for many chemical reactions in solution. From the dynamics we have derived the interface for experimental verification, namely transient electronic, infrared, and Raman spectra as well as X-ray diffraction, all of which are potentially observable manifestations of the atomic motions during the reaction. We have tested our approach on the simple inorganic I2 photodissociation and solvent caging reaction. The agreement between molecular dynamics based theory and experimental picosecond transient electronic absorption spectrum as a function of solvent, time, and wavelength is sufficiently close as to indicate that for the first time we are discovering at least part of the molecular dynamics by which a real solution chemical reaction takes place. Author (GRA)

N83-26942# Army Electronics Research and Development Command, Fort Monmouth, N. J. Electronic Technology and Devices Lab.
ELECTROCHEMICAL STUDIES AT CARBON BLACK PASTE ELECTRODES CONTAINING CUPRIC CHLORIDE ADDITIVE
Wishvender K. Behl Dec. 1982 13 p refs
(DA Proj. 1L1-61102-AH-47)
(AD-A125276; DELET-TR-82-11) Avail: NTIS HC A02/MF A01 CSCL 07/4

The use of cupric chloride as a cathode additive in lithium-thionyl chloride cells was investigated. Carbon black paste microelectrodes containing 21.7 weight percent of cupric chloride were used to study the effect of cupric chloride additive on cyclic voltammograms, polarization curves and cathode potential during discharge. It was found that the incorporation of cupric chloride in the carbon black cathode structure resulted in lowering of the cathode polarization so that carbon black cathode containing the additive showed higher cathode voltages than the carbon black cathodes without the additive. Cyclic voltammetry at these microelectrodes also showed that the thionyl chloride reduction peak was also shifted to more positive potentials in the cyclic voltammograms. Author (GRA)

N83-26943# Wisconsin Univ., Madison. Mathematics Research Center.
A CALCULATION OF WRINKLED FLAMES Technical Summary Report
H. V. McConnaughey, G. S. Ludford, and G. I. Sivashinsky Nov. 1982 19 p refs
(Contracts DAAG29-80-C-0041; DE-AC03-76SF-00098; Grant NSF MCS-79-27062)
(AD-A125258; MRC-TSR-2450) Avail: NTIS HC A02/MF A01 CSCL 21/2

In an earlier work, Sivashinsky derived a nonlinear integro-differential equation for spontaneous hydrodynamic instability of a plane flame front. The simplified form of that equation which describes a steady progressive wave of long period is reconsidered here. It is shown to represent a wrinkled flame front whose slope has a logarithmic singularity at each wrinkle. We have computed the flame profile and its speed of propagation more accurately than done previously by Michelson and Sivashinsky, and find that the increase in propagation speed due to wrinkling is in surprisingly good agreement with recent experimental findings. GRA

N83-26944# Pittsburgh Energy Technology Center, Pa.
PROCEEDINGS OF THE 4TH INTERNATIONAL SYMPOSION ON COAL-SLURRY COMBUSTION, VOLUME 1
1982 300 p refs Symp. held in Orlando, Fla., 10-12 May 1982
(DE82-016335; CONF-820519-Vol-1) Avail: NTIS HC A13/MF A01

The proceedings of this conference are contained in four volumes. The first volume deals with research programs and demonstration projects. Overviews are presented of the research activities into coal-liquid mixtures in Brazil, Canada, China, France, Japan, Spain, Sweden, and the USA, and the coordinated research program of the International Energy Agency. Descriptions and

results, when available, are given of the various demonstration projects testing the preparation, transport, storage, stability, and combustion performance of coal-oil mixtures for use in boilers and blast furnaces. Separate abstracts were prepared for most of the papers presented at the conference. DOE

N83-26945# Physical Sciences, Inc., Andover, Mass.
SYNTHETIC-FUEL COMBUSTION: POLLUTANT FORMATION. SCOT-INITIATION MECHANISMS IN BURNING AROMATICS Final Report, 19 Sep. 1980 - 18 Sep. 1982
W. T. Rawlins, T. Tanzawa, S. P. Schertzer, and R. H. Krech Jan. 1983 155 p refs
(Contract DE-AC22-80PC-30292)
(DE83-005611; DOE/PC-30292/8; PSI-TR-361) Avail: NTIS HC A08/MF A01

Soot initiation in the pyrolysis and combustion of the aromatic model fuels toluene and pyridine are described. These molecules were chosen as generic examples of the aromatic component of synthetic fuels which is thought to dominate formation in combustion of these fuels. The experiments were conducted in a shock tube over the ranges 1300 to 2500 K and 0.2 to 0.8 atm, using optical diagnostics to monitor the appearance of soot particles and the kinetic behavior of several gas phase species. Major results of this study include validation of the applicability of optical diagnostics in sooting systems; observations of strong influence of fuel molecular structure on sooting behavior; and postulation of a conceptual sooting mechanism to account for the existing data base. DOE

N83-26946# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
MOLECULAR BEAM STUDIES OF PRIMARY PHOTOCHEMICAL PROCESSES
Yuan T. Lee Dec. 1982 16 p refs Presented at the Intern. Conf. on Photochem. and Photobiol., Alexandria, Egypt, 5-10 Jan. 1983
(Contract DE-AC03-76SF-00098)
(DE83-006190; LBL-15480; CONF-830128-1) Avail: NTIS HC A02/MF A01

Application of the method of molecular beam photofragmentation translational spectroscopy to the investigation of primary photochemical processes of polyatomic molecules is described. Examples will be given to illustrate how information concerning the energetics, dynamics, and mechanism of dissociation processes can be obtained from the precise measurements of angular and velocity distributions of products in an experiment in which a well defined beam of molecules is crossed with a laser. DOE

N83-26947# Argonne National Lab., Ill. Materials Science Div.
ANALYSIS OF A FAILED SPENT-CHAR TRANSFER LINE FROM THE IGT HYGAS COAL-GASIFICATION PILOT PLANT
M. C. Shin (Korea Advanced Inst. of Science and Technology), D. R. Diercks, and G. M. Dragel Mar. 1982 36 p refs
(Contract W-31-109-eng-38)
(DE82-014906; ANL/FE-82-5) Avail: NTIS HC A03/MF A01

A failed spent char transfer line from the IGT HYGAS Coal Gasification Pilot Plant was analyzed. The line was fabricated primarily of RA 330, except for one length of Incoloy 800 piping and Type 316 stainless steel hub pieces at each end of the horizontal line. At one of these locations, namely the downstream hub, the cracking was accompanied by substantial corrosive attack. Little or no corrosion was noted at the other two failure sites. The failures were attributed to a combination of: (1) thermal stresses produced by temperature cycles experienced during the discharge of hot char; and (2) sulfidation caused by prolonged or repeated contact of the line with sulfur containing hot char. It was recommended that the horizontal portion of the line be redesigned to reduce mechanical constraints, that the severity of the imposed temperature cycles be reduced if possible, and that the hub pieces be fabricated of a more sulfidation resistant alloy. DOE

N83-26948# California Univ., Berkeley. Lawrence Berkeley Lab. Dept. of Mathematics.
ANALYSIS OF FLAME PROPAGATION Ph.D. Thesis
James A. Sethian May 1982 139 p refs
(Contract DE-AC03-76SF-00098)
(DE82-018582; LBL-14125) Avail: NTIS HC A07/MF A01

A premixed, combustible fluid is considered and the front between the burnt and unburnt regions is modeled as an infinitely thin curve propagating in a direction normal to itself at a constant speed. Results show a deep analogy between the equations of flame propagation and hyperbolic systems of conservation laws. The notion of ignition curves and an entropy condition are introduced which permit solving the equations of flame propagation in the absence of fluid motion. It is proven that any initial front asymptotically approaches a circle as it burns, and that if two fronts start close to each other, they remain so. As the front moves, it may form cusps which absorb sections of the flame front, destroying information about the initial shape of the front. Once a cust forms, it is impossible to retrieve the initial data by solving the equations of motion backwards in time. The difficulties involved in a numerical approximation to the equations of flame propagation are discussed and a numerical technique that does not rely on a discrete parameterization of the initial front is analyzed. DOE

N83-26949# Vetter Research, Costa Mesa, Calif.
RADIOLABELLING OF CHEMICALS
O. J. Vetter and V. Kandarpa 22 Jun. 1982 20 p refs
(Contract DE-AC03-78ET-27146)
(DE82-017576; DOE/ET-27146/T11) Avail: NTIS HC A02/MF A01

Labeling of chemical additives with radioactive isotopes can solve numerous problems is geothermal operations. The physical and chemical behavior of many chemicals slated for geothermal operations can be studied with the required detail at the extremely low concentration of the commercially available (non-labeled) compounds. The problems of labeling and the basics of these radioactively labeled chemicals are described. Conclusions are: (1) chemicals labeled with radioactive isotopes can be used to investigate the chemical and physical behavior of chemical additives used in geothermal operations. The high detection limits make this technology superior to conventional analytical and monitoring methods; (2) severe difficulties exist for utilizing radioactively labeled chemicals in geothermal operations. The labeling itself can cause technical problems. DOE

N83-26950# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
MOLECULAR INGREDIENTS OF HETEROGENEOUS CATALYSIS
Gabor A. Somorjai Jun. 1982 42 p refs Presented at the 4th Intern. Congr. in Quantum Chem., Uppsala, 14-19 Jun. 1982
(Contract DE-AC03-76SF-00098)
(DE82-018584; LBL-14531; CONF-820697-1) Avail: NTIS HC A03/MF A01

The introduction to the methodology and results of the surface science of heterogeneous catalysis is followed by a review of the concepts of heterogeneous catalysis. Then, the experimental results that identified the three molecular ingredients of catalysis, structure, carbonaceous deposit and the oxidation state of surface atoms are described. Finally attempts to build catalyst systems and the theoretical and experimental problems that appeared in the course of this research are described. DOE

N83-26951# Brookhaven National Lab., Upton, N. Y. Process Sciences Div.
FLASH PYROLYSIS AND HYDROPYROLYSIS OF BIOMASS
Meyer Steinberg and Peter Fallon Apr. 1982 6 p refs Presented at the 17th Intersociety Energy Conversion Engineering Conf., Los Angeles, 8 Aug. 1982
(Contract DE-AC02-76CH-00016)
(DE82-015807; BNL-31271; CONF-820814-11) Avail: NTIS HC A02/MF A01

Process chemistry data on the flash pyrolysis and hydropyrolysis of wood is being obtained in a 1 inch downflow entrained

tubular reactor. The data indicates that at residence times of > 1 second, and 900 to 1000 C and 500 psi pressure, the flash hydropyrolysis of wood yields mainly methane and water. As the residence time increases to > 3 seconds, the products are methane and CO. Almost complete conversion of the carbon to methane and CO are obtained in these experiments. At lower temperatures, in the order of 800 C, 500 psi and residence times > 4 seconds, significant amounts of benzene and ethane are produced. The experimental process chemistry data have been used to design and evaluate two processes in a preliminary manner. One process converts wood to high BTU pipeline gas and the other to methanol and chemical feedstocks consisting of benzene and ethylene. Reasonable plant investments which compare favorably with coal conversion plant estimates are derived. DOE

N83-26952# Exxon Nuclear Idaho Co., Inc., Idaho Falls.
AUTOIGNITION OF KEROSENE/OXYGEN MIXTURES IN A FLUIDIZED BED
L. L. Taylor May 1982 110 p refs
(Contract DE-AC07-79ID-01675)
(DE82-016376; ENICO-1112) Avail: NTIS HC A06/MF A01

Startup of the in-bed combustion system in the Waste Calcining Facility uses a heated fluidizing air stream to bring the fluidized bed to the autoignition temperature of kerosene/oxygen. Measurable ignition lag times in excess of 300 seconds were encountered along with demonstrated autoignition of kerosene/oxygen mixtures in a fluid bed at temperatures below 300 C. Pilot plant data to date indicates that the 360 C temperature limit imposed for autoignition could be lowered to 340 C without compromising existing safety considerations. Pilot plant tests examined: (1) O2/fuel ratios; (2) atomizing nozzle spray patterns; (3) fuel/oxygen mass velocities; and (4) various bed materials for their effect on autoignition temperatures of kerosene/oxygen in a fluid bed. DOE

N83-26953# Sandia Labs., Albuquerque, N. Mex.
QUANTITATIVE ANALYSIS OF PHOSPHOSILICATE GLASS FILMS ON SILICON WAFERS
S. H. Weissman and S. G. Hallett Apr. 1982 46 p refs
(Contract DE-AC04-76DP-00789)
(DE82-017642; SAND-82-0039) Avail: NTIS HC A03/MF A01

The phosphorus and silicon content of 6000 to 10,000A phosphosilicate glass films deposited on 5 cm diameter <100> silicon wafers. The thin film was removed from the wafer by etching with dilute hydrofluoric acid; and the P and Si content of the solution was determined by inductively coupled plasma - atomic emission spectroscopy (ICP). Assuming these two elements were in film as P2O5 and SiO2, the calculated weight percent of phosphorus in the film ranged from 2.2 to 12 wt wt% with an estimated uncertainty of 2.73 to 10.1 relative percent. These analyses will be used to determine the composition of standards which were prepared simultaneously with these samples. Results will aid in control of one step in a microcircuit fabrication process involving chemical vapor deposition of phosphosilicate glass on silicon wafers by determination of the P content per unit area for control samples using a Kevex X-ray fluorescence spectrometer. DOE

N83-26954# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
CONVOLUTION TECHNIQUES IN ANALYTICAL ELECTROCHEMISTRY Ph.D. Thesis
Jeffrey James Toman Jun. 1982 279 p refs
(Contract DE-AC03-76SF-00098)
(DE82-018531; LBL-14429) Avail: NTIS HC A13/MF A01

The application of curve fitting techniques to convolution potential sweep voltammetry, called convolutive voltammetric curve fitting, is described. Fitting functions are derived from theoretical relations among semiintegral, current, and potential. Use of these fitting functions allows the return of more mechanistic information than was previously possible. Validity of the techniques is determined by application to artificial voltammograms created by digital simulation methods. The validity of semiderivative voltammetric curve fitting in fitting waves of several kinetic mechanisms is also investigated. The usefulness of semiderivative voltammetric curve fitting (s.v.c.f.) is determined in application to real linear sweep and anodic stripping voltammograms. An experimental setup is described in which data acquisition and experimental control are performed solely by a dedicated laboratory microcomputer. DOE

N83-26955# Brookhaven National Lab., Upton, N. Y.
APPLICATIONS OF RESONANCE-AVERAGED GAMMA-RAY SPECTROSCOPY WITH TAILORED BEAMS
R. E. Chrien 1982 21 p refs Presented at 3rd Intern. Symp. on Neutron Induced Reactions, Smolenice, Czechoslovakia, 21 Jun. 1982
(Contract DE-AC02-76CH-00016)
(DE82-018098; BNL-31537; CONF-820657-2) Avail: NTIS HC A02/MF A01

The use of techniques based on the direct experimental averaging over compound nuclear capturing states has proved valuable for investigations of nuclear structure. The various methods that were employed are described, with particular emphasis on the transmission filter, or tailored beam technique. The mathematical limitations on averaging imposed by the filter bandpass are discussed. It can readily be demonstrated that a combination of filters at different energies can form a powerful method for spin and parity predictions. Several examples from the HFBR program are presented. DOE

N83-26956# Sandia Labs., Albuquerque, N. Mex.
HIGH-RESOLUTION STIMULATED RAMAN SPECTROSCOPY
P. Esherick and A. Owyoung 1982 19 p refs Presented at NATO Advanced Study Inst. on Nonlinear Raman Spectry. and its Chem. Appli., Bad Windsheim, West Germany, 23 Aug. 1982
(Contract DE-AC04-76DP-00789)
(DE82-013490; SAND-82-1058C; CONF-820811-1) Avail: NTIS HC A02/MF A01

The development of stimulated Raman spectroscopy (SRS) as a valuable tool in gas phase Raman studies is traced, the capabilities of the stimulated Raman spectrometer are detailed, and a variety of applications of the system to problems in the gas phase are surveyed. The technique is most attractive in ultra-high resolution studies that are beyond the reach of spontaneous Raman spectroscopy. Collision broadening effects dictate that such studies be performed at low pressures in order to maximize sensitivity. Currently, sample pressures below approximately 5 Torr are required in order to achieve linewidths approaching our 0.002/cm instrumental resolution. Sensitivity considerations have thus limited our studies at these low pressures to relatively strong Raman scattering modes. DOE

N83-26957# SRI International Corp., Menlo Park, Calif. Chemistry Lab.
IDENTIFICATION AND CLEAVAGE OF BREAKABLE SINGLE BONDS BY SELECTIVE OXIDATION, REDUCTION, AND HYDROLYSIS
Albert S. Hirschon, John Zevely, and Frak R. Mayo 25 May 1982 22 p refs
(Contract DE-AC22-78ET-11423)
(DE82-016800; DOE/ET-11423/T4) Avail: NTIS HC A02/MF A01

The proportions of the various kinds of connecting links in coal were determined and determination of the structure of bituminous coal, with emphasis on the cross-links and breakable single bonds. An extraction of Illinois No. 6 coal, some swelling experiments of Illinois No. 6 coal products, and some extrations of other recently acquired coal samples re described. The results show that on long heating at a high solvent to coal ratio ethanolamine does not extract as much material from whole coal as either BnNH2 of EDA, yet the swelling ratio of the extracted coal is greater than with the other amines. BnNH2 swells both EDA/DMSO- and pyridine extracted coals better than other amine solvents tested, including ethanolamine. The EDA/DMSO-extracted

coal is swollen more by all the solvents tested than pyridine extracted coal. DOE

N83-26958# Energy and Environmental Research Corp., Irvine, Calif.
SOOT FORMATION IN SYNTHETIC-FUEL DROPLETS
J. C. Kramlich, W. R. Seeker, and R. Payne Jun. 1982 47 p refs
(Contract DE-AC22-80PC-30298)
(DE82-018420; DOE/PC-30298/T7) Avail: NTIS HC A03/MF A01

A phenomenological understanding of droplet combustion and associated carbonaceous particulate formation for synthetic fuel oils was developed. The physical processes that occur to a droplet in a spray flame are schematically represented. The actual path that a droplet takes after it is injected into the hot flame zone was found to depend not only on the fuel properties but the flame zone environment. Secondary atomization, droplet dispersion and fuel effects are discussed. Soot yield and the physical processes occurring during droplet burning were influenced by fuel parameters. For dispersed conditions, the yield of soot was found to increase markedly with the fuel C/H ratio whether the gas-phase environment was lean or rich. In addition, to the secondary atomization that occurred with some fuel blends, the droplet termination mechanism was also strongly influenced by fuel effects. DOE

N83-26959# General Electric Co., Schenectady, N. Y. Corporation Research and Development Dept.
CATALYTIC CO2 GASIFICATION OF GRAPHITE VS. COAL CHAR
C. L. Spiro, D. W. McKee, P. G. Kosky, and E. J. Lamby 1982 11 p refs
(Contract DE-AC21-80MC-14591)
(DE82-016412; DOE/MC-14591/T2) Avail: NTIS HC A02/MF A01

The effects of alkali carbonate catalysts on the CO2 gasification of Illinois No. 6 HVB bituminous coal char, demineralized Illinois No. 6 coal char, Pittsburgh No. 8 HVA coal char, Navajo sub-bituminous coal char, Reading anthracite coal char, North Dakota A lignite char and spectroscopic grade highest purity graphite were reported. Alkali carbonate salts are effective Boudouard catalysts for all these substrates, but salient difference between coal char vs. graphite reactivity are observed. Structural differences in chars vs. graphite which might be responsible for these effects were identified. By eliminating minerals and surface phenomena, residual hydrogen was identified as the main cause of reactivity differences. No mechanisms completely account for the observed gasification behavior in the presence of these salts, particularly as a function of loading. Indeed, the fundamental aspects of the periodic trend of salt efficacy is far from understood. DOE

N83-26960# General Electric Co., Schenectady, N. Y. Corporate Research and Development Center.
COAL-GASIFICATION CATALYSIS MECHANISMS
P. G. Kosky, E. J. Lamby, D. H. Maylotte, D. W. McKee, and C. L. Spiro Apr. 1982 157 p refs
(Contract DE-AC21-80MC-14591)
(DE82-013824; DOE/MC-14591/1173) Avail: NTIS HC A08/MF A01

The catalytic gasification of chars by H2O(g), D2O(g), CO2 and mixtures of H2O(g)/CO and CO2/CO was studied. The catalysts were common alkali salts or eutectic mixtures thereof, the alkaline earths and a transition metal based series (Ni). The most active catalysts were those in the alkali series with a definite cationic trend which, in CO2, was in he molar concentration ranked order CS> K> NA>. The alkaline earth series behaved differently from the alkali series. To test the hypothesis that a reduction/oxidation cycle was in effect rather than an OH exchange site, exchange reactions were run with D2O substituting for H2O. Based on the strength of the OH/OD stretching bonds it was concluded that the rate constants should vary by a factor of about 1.5 to 2.5 in the temperature range of interest. This was quantitatively observed for the uncatalyzed but not for the catalyzed chars, unequivocally indicating a profound change of mechanism. DOE

N83-26961# Chem Systems, Inc., Fairfield, N.J. Research and Development Group.
LIQUID-PHASE METHANATION/SHIFT PROCESS DEVELOPMENT Final Technical Report, 1 Sep. 1980 - 30 Nov. 1981
12 May 1982 236 p refs
(Contract DE-AC21-80MC-14384)
(DE82-015214; DOE/MC-14384/1200) Avail: NTIS HC A11/MF A01

A total of 44 runs were completed covering testing of five commercially available catalysts at 900 F, 1000 psig and 10,000/h VHSV. The shifted methanation feed gas consisted of 63% H2, 19% CO, 2% CO2 and 16% CH4. To determine the effects of steam, twenty of the scans had 15% steam injected into the feed gas. Each test ran for 100, 300, 600 or 1200 hours with continuous effluent sampling and temperature profile monitoring. At each of the termination points, a catalyst sample was taken from the hot spot section of the bed for analysis. Carbon was deposited on the catalyst under the methanation conditions studied. The rate of carbon deposition was primarily a function of catalyst properties and not of the thermodynamics of the methanation reaction system. In spite of heavy carbon deposition, the catalytic behavior for these systems generally remains unaffected. Physical plugging of the catalyst bed is the limiting condition of the process and not catalyst deactivation. DOE

N83-26962# Physical Sciences, Inc., Woburn, Mass.
PULVERIZED FUEL AND SCALEUP METHODOLOGIES Quarterly Report, 1 Jan. - 31 Mar. 1982
N. H. Kemp, P. F. Lewis, and T. Tanzawa 1982 28 p refs
(Contract DE-AC22-80PC-30294)
(DE82-014822; PSI-TR-325; DOE/PC-30294/9; QR-6) Avail: NTIS HC A03/MF A01

Efforts devoted toward developing and formulating the quasi-one dimensional fluid flow and mixing model are described. The formulation and procedure for this model are described in this report. Also included in this report are the revised gas phase chemistry package for hydrocarbons and a description of the radiative transport model. DOE

N83-26963# General Electric Co., Schenectady, N. Y. Corporate Research and Development.
H2S REMOVAL FROM COAL GAS AT MID TEMPERATURE (150 TO 200 DEG C) Annual Report, 1 Oct. 1980 - 30 Sep. 1981
S. G. Kimura, B. M. Kim, and J. A. Schultz Feb. 1982 78 p refs
(Contract DE-AC01-80ET-15288)
(DE82-011004; DOE/ET-15288/1) Avail: NTIS HC A05/MF A01

Four potential absorbents: zinc sulfate, nickel, coal ash leachate, and redox reagents, have been identified and evaluated. The Zn SO4 absorbent had excellent H2S removal capability, and will simultaneously absorb ammonia. However, regeneration of the ZnS has been incomplete, and is expected to be excessively slow. Nickel works best as Ni(OH)2. H2S removal efficiency is excellent, and regeneration capability is good. Because the absorbent is a slurry, some plugging of the absorption column was noted. The coal ash leachate was simulated with Fe(OH)3. This has been found to be the poorest of the absorbents, although its H2S absorption efficiency is adequate. Because the absorbent is derived from coal ash, regeneration is not an issue. The redox process has been evaluated in several modes: 2 stage absorption/regeneration with FeNaHEDTA redox reagent, direct oxidation with the redox reagent, and water only direct oxidation, the last of which was found to be unexpectedly effective. The major concern of the processes using the redox reagent is degradation of the organic HEDTA, which was measured and found to require careful control. DOE

N83-26964# California Univ., Berkeley. Dept. of Chemical Engineering.
DEW POINTS OF HOT GASES FROM COAL-GASIFICATION PROCESSES Final Report

A. Monge, A. B. Macknick, C. vandeRostyne, and J. M. Prausnitz
May 1982 104 p refs
(Contract DE-AC21-79ET-14884)
(DE82-016337; DOE/ET-14884/1224) Avail: NTIS HC A06/MF A01

Effluent gases from coal gasification processes often contain high molecular weight hydrocarbons (tars) which, upon condensation, may foul heat exchangers needed to recover sensible heat. Efficient design of heat exchangers and separation equipment for the removal of tars requires information about the phase equilibrium behavior of these systems. A computer program was written to predict dew points and condensation versus temperature behavior of gasifier effluents containing coal tars. Predictions were tested using experimentally determined dew points for methane/water/Lurgi coal tar fraction mixtures. The comparisons are generally good. Calculation of tar properties is based on a tar characterization procedure where vacuum distillation, at high reflux, is used to produce narrow boiling fractions. Each fraction is treated as a pseudo component; its properties are based on the vapor pressure datum obtained during fractionation, on the results of elemental analysis, and on the proton NMR spectrum of the fraction. DOE

N83-26965# Purdue Univ., Lafayette, Ind. Combustion Lab.
GASIFICATION IN PULVERIZED COAL FLAMES. INVESTIGATION OF PULVERIZED COAL-COMBUSTORS AND GASIFIERS: MULTIPLE SUB-REACTOR MODEL AND EXPERIMENTAL RESULTS, PART 2 Final Report
P. E. George and N. M. Laurendeau Apr. 1982 545 p refs
(Contracts DE-AC01-76ET-10546; E(49-18)-2029)
(DE82-013001; DOE/ET-10546/T1; ME-TSPC-TR-82-12; FE-2029-10) Avail: NTIS HC A23/MF A01

The feasibility of using currently available pulverized coal burners to produce power or synthesis gas from coal was examined. Two configurations are considered: the annular confined jet with secondary swirl, and the vortex tube with tangential entry. The first burner is characterized by a single axial injector of high primary velocity; secondary swirl is used to control mixing and residence times. The second burner is modeled after the cyclone combustor; large residence times and slagging operation should lead to high carbon efficiencies. Species concentrations and temperature are measured both within and downstream of the gasifier chambers. These profiles are used to assess the influence of process variables such as pressure, solid/gas feed rates, swirl intensity, inlet temperature and geomerical injection pattern on both the rate and extent of coal conversion. Simple models governing entrained flow systems will be developed to further interpret the experimental data. DOE

N83-26966# Pittsburgh and Midway Coal Mining Co., Englewood, Colo.
SOLVENT REFINED COAL (SRC) PROCESS. CORROSION-EROSION STUDY Interim Report, Sep. 1980 - Sep. 1981
J. D. McCoy Jan. 1982 57 p
(Contract DE-AC05-76ET-10104)
(DE82-011499; DOE/ET-10104/55) Avail: NTIS HC A04/MF A01

In the liquefaction process to convert coal to cleaner liquid fuels, gas-solid-liquid mixtures are encountered at high pressure and high temperature. These conditions necessitate designing and construction equipment for demonstration or commercial scale plants that provide adequate resistance to the combined effects caused by corrosion and erosion. The four objectives of the study are: the corrosivity of SRC-II oil and water streams, evaluate the fouling characteristics of SRC-II liquid products, assess available technology to measure thickness of hot pipe and vessels, and evaluate the corrosion-erosion effects of hot coal-gas-oil slurries. DOE

N83-26967# Battelle Columbus Labs., Ohio.
THERMOPHYSICAL PROPERTIES OF COAL LIQUIDS Final Report
J. W. Droege, G. H. Stickford, J. R. Longanbach, R. Venkateswar, and S. P. Chauhan 23 Apr. 1982 205 p refs
(Contract DE-AC22-79ET-14941)
(DE82-013366; BMI-2092) Avail: NTIS HC A10/MF A01

Thermophysical properties for coal solvent slurries were determined in the range 300 to 600 K, in some cases extending to 700 K. Density, viscosity, thermal conductivity, and enthalpy were determined. A recycle solvent from the Wilsonville SRC-I plant and a KY-9 coal were used. Rheology was studied with a reciprocating cylinder viscometer designed to operate at elevated pressure and temperature. Viscous properties were found to follow the Bingham plastic model. A high viscosity peak in the range 500 to 600 K was characterized by very high values of yield stress. At other temperatures the slurries were nearly Newtonian. Time and temperature dependence of viscous behavior were studied. Densities were determined by high temperature pyknometer, thermal conductivities by the transient line source technique, and enthalpies by drop calorimeter and by pressure DSC. DOE

N83-26968# EIC, Inc., Newton, Mass.
DEVELOPMENT OF PHOTOELECTROCHEMICAL CELLS BASED ON COMPOUND SEMICONDUCTORS AND NONAQUEOUS ELECTROLYTES Semiannual Report, 1 May - 31 Oct. 1981
R. D. Rauh, M. E. Langmuir, R. A. Boudreau, and M. A. Parker Mar. 1982 67 p refs
(Contracts EG-77-C-01-4042; DE-AC02-77CH-00178)
(DE82-013700; SERI/PR-8001-7-T4) Avail: NTIS HC A04/MF A01

A reproducible procedure for chemical bath deposition (CBD) of CdSe was documented in detail, allowing a consistent production of photoelectrode yielding 5.5 to 6.5% conversion efficiency in alkaline polysulfide electrolyte (employing a tungsten halogen lamp/KG-2 filter solar simulated light source). The CBD films of n-CdSe on Ti have achieved an efficiency of approximately 10% under both solar simulated and real sunlight conditions using a Fe(cn)6 (-3/-4) electrolyte at pH13. For an initial current density of 16 mA/square cm (approximately 80 mW/square cm illumination), a decrease of approximately 25% is observed after 3 hours illumination. Research was completed on developing a stable Cu (+/+2) redox electrolyte in CH3CN, which contains excess Cl (-), to promote photochemical stability. For poly-n-GaAs, best results were obtained for electrolytes containing approximately 0.5m CuCl, 0.05m CuCl2 and 1m tetrabutylammonium chloride. DOE

N83-26969# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
FUNDAMENTAL PYROLYSIS STUDIES Annual Report, 1981
Thomas A. Milne and Michael N. Soltys Mar. 1982 45 p refs
(Contracts EG-77-C-01-4042; DE-AC02-77CH-00178)
(DE82-009808; SERI/PR-234-1454) Avail: NTIS HC A03/MF A01

The direct mass spectrometric studies of fast pyrolysis completed in FY 1981 are summarized, with detailed results of fourth quarter activities. The latest version of the flame gas pyrolysis/molecular beam sampling system is schematized with discussion of fast data acquisition capabilities and instrument tuning. Temperature effects in the pyrolysis plume are presented. Background corrected mass spectra are shown for the pyrolysis in 900 C steam argon of small samples (approximately 10 to 20 mg) of levoglucosan, glucose, cellulose, lignin, and wood. A very preliminary identification of major products and comparison with the literature is presented. The effects of physical dimensions and alkali catalysts on primary pyrolysis products are shown. A grid heating apparatus is described, and plans for FY 1982 are outlined. DOE

N83-26970# Science Applications, Inc., Chatsworth, Calif. Combustion Science and Advanced Technology Dept.
SPRAY COMBUSTION OF SYNTHETIC FUELS. PHASE 2: SPRAY-COMBUSTION PHENOMENA Quarterly Report, 1 Jan. - 31 Mar. 1982
30 Apr. 1982 145 p refs
(Contract DE-AC22-81PC-40276)
(DE82-015489; DOE/PC-40276/T2; QR-2) Avail: NTIS HC A07/MF A01

Physical and chemical processes relevant to synfuel combustion, are addressed fundamental information and data bases applicable to synfuel utilization in industrial combustors, are considered, and associated combustion models and synfuel utilization criteria with special emphasis on spray combustion are discussed. Progress reports for the following tasks are presented: (1) generation of property data base; (2) kinetic assessment; (3) development of modular spray combustion; (4) test preparation activities; (5) application of modular spray combustion models. DOE

N83-26971# Virginia Commonwealth Univ., Richmond. Dept. of Chemistry.
NEW CATALYSTS FOR THE INDIRECT LIQUEFACTION OF COAL Quarterly Technical Report, 1 Nov. 1981 - 31 Jan. 1982
G. A. Melson 1982 7 p refs
(Contract DE-FG22-80PC-30228)
(DE82-017190; DOE/PC-30228/T4; QTR-2) Avail: NTIS HC A02/MF A01

The evaluation of some iron/zeolite catalysts for synthesis gas conversion was conducted. Effects of % iron loading, pretreatment and support were determined. DOE

N83-26972# Brigham Young Univ., Provo, Utah. Combustion Lab.
PREDICTION AND MEASUREMENT OF OPTIMUM OPERATING CONDITIONS FOR ENTRAINED COAL-GASIFICATION PROCESSES Final Report, 1 Nov. 1979 - 31 Dec. 1981
Paul O. Hedman, L. Douglas Smoot, Philip J. Smith, and Angus O. Blackham Dec. 1981 193 p refs 3 Vol.
(Contract DE-AC21-80MC-14380)
(DE82-015612; DOE/MC-14380/1210-Vol-1) Avail: NTIS HC A09/MF A01

Experimental and theoretical results of a twenty-six month study of entrained coal gasification with steam and oxygen are discussed. The gasifier facility and testing methods were revised for improvement in data accuracy. Fourteen tests were conducted in a laboratory gasifier to determine effects of inlet gas composition, temperature and swirl number on carbon conversion. A major increase in carbon conversion was observed with oxygen in the feed stream with the coal. The gasifier facility was also rebuilt for pressures to 250 psi and cold flow tests demonstrated facility operation to the maximum pressure. Sulfur pollutants were measured in eleven additional gasification tests. Methods for sulfur analysis were developed and the accuracy determined. Gasifier tests were also performed to support development of optical methods for analysis of gasifier effluents. A laser-Doppler velocimeter (LDV) was demonstrated for measurement of instantaneous velocity and turbulence intensity in non-reactive flow. DOE

N83-26973# Minnesota Univ., Minneapolis. Dept. of Chemistry.
VARIATIONAL TRANSITION-STATE THEORY Progress Report, Feb. 1981 - Jan. 1983
Donald G. Truhlar Jan. 1983 26 p refs
(Contract DE-AC02-79ER-10425)
(DE83-006003; DOE/ER-10425/07) Avail: NTIS HC A03/MF A01

New methods for calculating tunneling probabilities, including two general techniques applicable to systems with small and large reaction-path curvature were developed. These methods were tested successfully against accurate quantal calculations, and were applied to real systems in three dimensions. General algorithms for variational transition state theory calculations on polyatomic systems were developed and applied to the combustion reaction OH + H2 (FEMALE) H2O + H. A statistical-diabatic theory for state-selected rates was developed and applied. A totally ab initio prediction of an absolute chemical reaction rate, for the reaction Mu + H2 (FEMALE) MuH + H, using an accurate potential energy surface and methods that was demonstrated to be reliable by tests against accurate quantal collinear results were made. This prediction was confirmed by unpublished experiments. DOE

N83-26974# National Coal Board, Leatherhead (England). Coal Utilization Research Lab.
FLUIDISED-BED COMBUSTION. INITIAL RESULTS OBTAINED IN A 1-FT BY 1-FT FLUIDISED-BED COMBUSTOR OPERATING AT PRESSURES UP TO 20 ATM
A. G. Roberts and J. E. Stantan Sep. 1982 97 p
(Contract DE-AC21-80MC-14129)
(DE83-005956; DOE/MC-14129/1309) Avail: NTIS HC A05/MF A01

A 1 ft square pressurized fluidized-bed combustor was built to obtain performance data at pressures up to 20 atm. It has a tube bank containing cooled and uncooled elements in which the geometry and the proportion of cooled elements can be changed readily, so that operation over a wide range of pressures, excess air values, temperatures and velocities is possible. The maximum tub bank height that can be accommodated requires a bed depth of about 9 ft. The facility is described and the results from the first six tests are summarized. Data were acquired at different operating conditions during a total of 20 test periods, each of 15 to 24 hours duration. Most of the data were obtained at pressures of 6, 10, 16, and 20 atm; fluidizing velocity of 3 ft/s; bed temperature of 15600F; bed depths of 6 1/2 and 9 ft. The other main variables were Ca/S mol ratio and excess air. The results showed that: a combustion efficiency of 99.5% was achieved for all operating conditions; no systematic effect of pressure on SO2 retention has been established. Excess air greatly influences NOx emissions which were 0.5 lb/million Btu with 100% excess air and 0.25 lb/million Btu at 30% excess air and heat transfer to the cooling circuits increased with increasing pressure. DOE

N83-26975# Yale Univ., New Haven, Conn.
SIMULTANEOUS MULTIPOINT MEASUREMENTS OF DENSITY GRADIENTS AND TEMPERATURE IN A FLAME Progress Report, 1 Jul. 1982 - 31 Jan. 1983
R. K. Chang, B. T. Chu, and M. B. Long Feb. 1983 8 p
(Contract DE-AC02-81ER-10969)
(DE83-007291; DOE/ER-10969/2) Avail: NTIS HC A02/MF A01

An account is given of recent progress in the development of nonintrusive optical diagnostic techniques and the application of these techniques to turbulent combustion systems. The primary focus of the work over the past year has been in: (1) the use of a broadband rotational CARS technique for the measurement of temperature in flames, and (2) the use of spontaneous Raman scattering to simultaneously map out the fuel gas concentration in a turbulent diffusion flame at 2500 points in a plane intersecting the flow. A summary of new results in each of these areas is given. DOE

N83-26976# Sandia Labs., Livermore, Calif.
IGNITION AND FLAME-PROPAGATION STUDIES WITH ADAPTIVE NUMERICAL GRIDS
H. A. Dwyer, B. B. Sanders, and F. Raiszadek (California Univ., Davis) Nov. 1982 27 p refs Presented at the Combustion Inst. Symp. on Western States Section, Livermore, Calif., 11 Oct. 1982
(Contract DE-AC04-76DP-00789)
(DE83-005462; SAND-82-8855; CONF-821035-11) Avail: NTIS HC A03/MF A01

A new and efficient numerical method was developed to calculate time dependent, multidimensional flames. This method adapts the grid in an intelligent or solution dependent fashion so that the physics and chemistry of the flow are properly resolved. The method has the greatest advantages for thin flames, and is preferred in steady flows. For two dimensional problems the new method in combination with generalized coordinates leads to impressive resolution of ignition and flame propagation phenomena. For the study of ignition and flame propagation about a sphere in separated flow the results showed that the ignition process occurs slightly downstream of the separation point and not at the rear stagnation point. All flame propagation calculations were completed without problems due to oscillations or numerical viscosity, which are effectively eliminated with this new technique. DOE

N83-26977# Mason and Hanger-Silas Mason Co., Inc., Amarillo, Tex.
QUANTITATIVE ANALYSIS OF TATB IMPURITIES BY THIN LAYER CHROMATOGRAPHY
Clifford L. Schaeffer Jan. 1983 6 p ref
(Contract DE-AC04-76DP-00487)
(DE83-007094; MHSMP-83-06; PDE-205) Avail: NTIS HC A02/MF A01

A method for quantitative analysis of impurities in TATB was developed using a densitometer to analyze spots on thin-layer chromatographic plates. The precision associated within the densitometer averaged 3.98% standard deviation. Spotting and developing the plate decreased the precision to 5.4% standard deviation. DOE

N83-26978# Los Alamos Scientific Lab., N. Mex. Energy Div.
VERIFICATION STUDIES OF ENTRAINED-FLOW GASIFICATION AND COMBUSTION SYSTEMS WITH THE SIMMER-II CODE
E. J. Chapyak, P. J. Blewett, and D. J. Cagliostro 1982 79 p refs Presented at the 10th IMACS World Congr. on Systems Simulation and Sci. Computation Meeting, Montreal, 8-13 Aug. 1982
(Contract W-7405-eng-36)
(DE82-012148; LA-UR-82-858; CONF-820810-5) Avail: NTIS HC A05/MF A01

A series of code verification studies on entrained-flow phenomena is described. Calculations of turbulent gas/particle flow in free jets and confined reactor geometries are compared to relevant experimental data and analytic solutions to assess model accuracy and to identify numerical limitations. DOE

N83-26979# Ames Lab., Iowa. Dept. of Physics.
EFFECTS OF MAGNETIC IMPURITIES ON THE APPARENT DIFFUSION COEFFICIENT OF HYDROGEN IN METAL HYDRIDES DEDUCED FROM NMR
T. T. Phua, R. G. Barnes, D. R. Torgeson, D. T. Peterson, M. Belhoui (Warwick Univ.), and G. A. Styles (Warwick Univ.) 1982 6 p refs Presented at Intern. Symp. on the Electron. Structure and Properties of Hydrogen in Metals, Richmond, Va., 4 Mar. 1982
(Contract W-7405-eng-82)
(DE82-019124; IS-M-391; CONF-820325-12) Avail: NTIS HC A02/MF A01

Observations of the well-known minimum in proton spin-lattice relaxation time, T sub 1 as a function of temperature, T, caused by diffusion-induced fluctuations of nuclear dipole-dipole interactions, are used to determine hydrogen diffusion coefficients, D, in metal-hydrogen systems. In several cases the minimum appeared asymmetric with a shallower low-temperature slope interpreted as a change to a diffusion mechanism with a lower activation energy. In a few cases a subsidiary low-temperature minimum observed or inferred and interpreted in terms of two coexisting mechanisms. These complications are likely to be due to interaction with paramagnetic impurities, analogous to the case of doped fast-ion conductors. It is concluded that some D(T) values deduced from existing NMR data must be treated with caution until measurements on specimens with controlled impurity content are complete. DOE

N83-26980# Illinois Univ., Urbana. Dept. of Metallurgy and Mining Engineering.
HYDROGEN TRANSPORT IN AND THROUGH NIOBIUM Ph.D. Thesis
Robert Sherman 1982 150 p refs
(Contract DE-AC02-76ER-01198)
(DE82-017214; DOE/ER-01198/1383) Avail: NTIS HC A07/MF A01

The roles of bulk diffusion and surface processes in hydrogen transport in and through niobium were examined. Bulk hydrogen and deuterium diffusivities and permeabilities were measured at high temperatures (700 to 1400 K) using diffusion controlled permeation methods. At lower temperatures, surface controlled permeation was used to investigate the role of the surface in hydrogen absorption and desorption. DOE

N83-26981# Brookhaven National Lab., Upton, N. Y.
THERMAL DESORPTION SPECTROSCOPY (TDS) OF HYDROGEN FROM NIOBIUM
V. J. Ghosh, M. A. Pick, D. O. Welch, and G. J. Dienes 1982 5 p refs Presented at the Intern. Symp. on the Electronic Struct. and Properties of Hydrogen in Metals, Richmond, 4 Mar. 1982
(Contract DE-AC02-76CH-00016)
(DE82-012024; BNL-31010; CONF-820325-6) Avail: NTIS HC A02/MF A01

Thermal desorption spectroscopy is often used to determine the activation energy of desorption of an adsorbate on a substrate as well as the order of the kinetics. In the case of flash desorption of an adsorbate from a surface obeying second order kinetics, a plot of log (theta sub o t squared sub p) vs 1/T/sub p/ (where theta/sub o is the initial surface coverage and T/sub P/is the temperature of the maximum desorption rate, i.e., the desorption temperature) will yield a straight line, the slope of which is determined by the chemisorption energy. However, it is argued that in the case of a system with hydrogen absorbed into the bulk in quasiequilibrium with adsorption sites on the surface, a similar plot, where the coverage theta/sub o/ must now be replaced by the initial concentration x/sub o/, will yield a slope determined by the heat of solution. In the following experiments the functional dependence of the desorption temperature on hydrogen loading as outlined above is verified. DOE

N83-26982# Department of Energy, Pittsburgh, Pa.
PROCEEDINGS OF THE FOURTH INTERNATIONAL SYMPOSIUM ON COAL-SLURRY COMBUSTION, VOLUME 3
1982 556 p refs Symp. held in Orlando, Fla., 10-12 May 1982 4 Vol.
(DE82-016351; CONF-820519-Vol-3) Avail: NTIS HC A24/MF A01

The proceedings of this conference are contained in four volumes. The third volume deals with coal slurry preparation and stabilization and coal slurry combustion and emissions. Coal-oil mixtures (COM) and coal-water slurries (CWS) are discussed. Additives for stabilization, an accelerated testing method for slurry stability, pretreatments of coal, deashing by oil agglomeration, rheological properties, continuous preparation equipment, handling and combustion properties, heat transfer and ash deposition, control of emissions from COM fired boilers, thermal performance, combustion kinetics of COM slurries, single droplets, and sprays, petroleum coke-oil slurries, and the amended Fuel Use Act are all discussed. DOE

N83-26983# Department of Energy, Pittsburgh, Pa.
PROCEEDINGS OF THE FOURTH INTERNATIONAL SYMPOSIUM ON COAL-SLURRY COMBUSTION, VOLUME 4
1982 377 p refs Symp. held in Orlando, Fla., 10-12 May 1982 4 Vol.
(DE82-016336; CONF-820519-Vol-4) Avail: NTIS HC A17/MF A01

The rheological characteristics and the factors affecting the rheology of coal-oil mixtures, coal water mixtures, coal-oil-ethanol mixtures, and charcoal-oil mixtures, and the equipment required for the handling, transport, storage, grinding, monitoring, atomization, and air pollution control of coal slurries are discussed. DOE

N83-26984# Research Inst. of National Defence, Umea (Sweden).
SILANIZATION: CHEMICAL SURFACE MODIFICATION OF SOLID SURFACES BY SILANE COUPLING AGENTS
Ulf Joensson, Magnus Malmqvist, Goeran Olofsson, and Inger Roennberg Jan. 1983 20 p refs In SWEDISH; ENGLISH summary
(FOA-C40166-C2(B2/A3)) Avail: NTIS HC A02/MF A01

A method for obtaining a stable surface modification of oxide covered surface by combining vacuum distillation of an organofunctional silane, with increased temperature of the surfaces to be silanized was developed. Silicon was surface modified, producing a homogenous aminosilane monolayer which can be reproduced. The stability and the functionality of the layer were checked by coupling of chemically reactive agarose beads to the surfaces.

The layer is stable for 48 hr at pH 1 to 11 and for temperatures up to 70 C. Author (ESA)

N83-26985# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
THE FO2 RADICAL AND LASER MAGNETIC RESONANCE (LMR) SPECTRA IN REACTIONS OF FLUORINE ATOMS
P. B. Davies (Cambridge Univ., England), F. Temps, H. Gg. Wagner, and D. P. Stern Dec. 1982 21 p refs Sponsored by Max-Planck-Gesellschaft and SRC
(MPIS-19/1982; ISSN-0346-1199) Avail: NTIS HC A02/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 6,15

Far infrared laser magnetic resonance spectra of the FO2 radical were detected at 11 laser frequencies during investigation of FO rotational spectra. The assignment is based on chemical and kinetic results and on a qualitative spectroscopic investigation. It is suggested that this radical may be responsible for many unassigned 5 and 10 micro laser magnetic resonance spectra. Author (ESA)

N83-26986# Imperial Coll. of Science and Technology, London (England). Computational Fluid Dynamics Unit.
REPRESENTATIONS OF COMBUSTION IN COMPUTER MODELS OF SPARK IGNITION
D. Brian Spalding Nov. 1982 12 p refs
(CFD/82/18) Avail: NTIS HC A02/MF A01

Calculation of rates of combustion in turbulent gases is discussed, and a predictive scheme is proposed which builds upon the analogy between turbulent combustion and two-phase flows, characterized by patchiness: sharp temperature (and concentration) differences in the former correspond to discontinuities of density and other properties in the latter. Applications to a one dimensional unsteady flame and to a two dimensional steady one are described. It is suggested that the proposed two-fluid theory can be developed to predict such phenomena quantitatively. Author (ESA)

N83-26987# Laboratory of the Government Chemist, London (England).
A NOVEL GENERAL PURPOSE COMPUTER CORRECTION PROCEDURE FOR QUANTITATIVE X-RAY FLUORESCENCE ANALYSIS
B. Stuart 1982 13 p refs
(LGC-1/1982) Avail: NTIS HC A02/MF A01

A semiempirical correction procedure for quantitative X-ray fluorescence analysis of a wide range of samples is described. Concentration of a given element is derived from the primary and secondary absorption matrices. The method is best suited to samples of low to medium average atomic number, in powder form. Calibration requires simple, easily synthesized standards, mostly of the single-element type. Matrix correction is achieved using a computerized mathematical model (a 1000 line BASIC program). Relative error is + or - 10%. Author (ESA)

N83-26988# Atomic Energy Research Establishment, Harwell (England). Materials Development Div.
TECHNIQUE AND APPLICATIONS OF X-RAY PHOTOELECTRON SPECTROSCOPY
J. C. Riviere Feb. 1983 98 p refs
(AERE-R-10803; HL83/500(C14)) Avail: NTIS HC A05/MF A01

Among the many techniques now available for the characterization of the composition and chemistry of surfaces, it is probable that X-Ray Photoelectron Spectroscopy (XPS) is the most widely used. This is because it is easy to use, relatively straightforward in interpretation and quantification, virtually non-destructive, and readily available commercially. In this paper, the technique of XPS is first described, i.e., the physical principles instrumentation, quantification, etc., and then a series of selected applications is discussed in order to provide some feeling for the ways in which XPS has been used in practice. At the end an indication is given as to the possible directions of future development of the technique, and a comparison made with the complementary technique of Auger Electron Spectroscopy since the two techniques are often used in the same equipment. Author

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N83-26989# United Kingdom Atomic Energy Authority, Risley (England).
MEASUREMENT OF THE CARBON ACTIVITY OF SODIUM WITH FOILS CONSISTING OF Fe-20Mn AND STAINLESS STEEL TYPES A304L AND 316L
C. Oberlin, P. SaintPaul, P. Baque, and L. Champeix 16 Feb. 1983 26 p refs Transl. into ENGLISH from Proc. of Specialists Meeting on Carbon in Sodium, IWGFR/33, 1979 p 122-131 Meeting held in Harwell, England, 27-30 Nov. 1979
(BLL-Risley-Trans-4719(9091.9F)) Avail: British Library Lending Div., Boston Spa, Engl.

An exact knowledge of the carbon activity of sodium used as a heat transfer fluid in fast breeder reactors is essential to understand carburization and decarburization. At equilibrium the carbon activities in the sodium and in the metal alloy are equal and if the correlation between the carbon content and activity of the alloy concerned is know, it is possible to estimate the carbon activity in the sodium. The materials used must possess the following qualities: have a high carbon solubility at the temperatures of utilization or lead to a high ratio between the carbon contents of the material and sodium respectively, permit rapid equilibration with the sodium, not contain impurities which can falsify the results. The materials chosen in the light of these criteria were Fe-20Mn and AISI 304L and 316L stainless steels. Author

N83-26990# United Kingdom Atomic Energy Authority, Risley (England).
KINETICS OF HYDROGEN-INDUCED STRESS CORROSION CRACKING. PART 1: IMPORTANT FEATURES OF CRACKING WITH REGARD TO HIGH STRENGTH STEELS
B. Stellwag and H. Kaesche 17 Jan. 1983 17 p refs Transl. into ENGLISH from Werkst. und Korros. (West Germany), v. 33, 1982 p 274-280
(BLL-Risley-Trans-4701(9091.9F)) Avail: British Library Lending Div., Boston Spa, Engl.

The embrittling action of the corrosion hydrogen in the brittle cracking of numerous alloy systems has shown itself to be of importance and is presently discussed at least for the following materials: high strength steel in aqueous solution, austenitic steel in dilute sulphuric acid, aluminum alloys in aqueous halogenide solutions, and uranium alloys in aqueous solutions. Hydrogen-induced stress corrosion cracking in a suitable material, the underlying damage mechanisms, and the kinetics of the growth of the cracking are examined. Steel and iron materials are known to be susceptible to hydrogen embrittlement. A high strength, low alloy steel was therefore selected as an experimental material, and the method of testing is oriented towards mechanical cracking. Author

N83-26991# British Library Lending Div., Boston Spa (England).
ASSESSMENT OF THE QUALITY OF BEARING STEEL FROM ITS INCLUSION CONTENT
V. V. Parabin, A. N. Samsonov, A. K. Petrov, V. I. Savchukov, and T. V. Danko 17 Feb. 1983 11 p refs Transl. into ENGLISH from Stal (USSR), v. 2, 1982 p 76-78
(BLL-M-26906-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

A formula was developed for assessing the fatigue properties of bearing steel according to its contents of oxide, globular and sulphide inclusions. Equations are presented governing the relationships between inclusion contents and bearing fatigue endurance. Results were obtained at various Soviet institutes and

steelworks. The bearing steel investigated was grade ShKh15.
Author

N83-26992# British Library Lending Div., Boston Spa (England).
THE BENEFICIAL EFFECT OF ZIRCONIUM AND CALCIUM WHEN JOINTLY MICROALLOYED WITH HIGH SPEED STEELS
V. A. Kharchenko, V. Yu. Slyusarev, and V. G. Kochergin 17 Feb. 1983 3 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved., Chern. Metall. (USSR), v. 2, 1982 p 153
(BLL-M-26914-(5828.4)) Avail: British Library Lending Div., Boston Spa, Engl.

The joint addition to high temperature heat resisting high speed steel of an inoculant (zirconium) and an inhibitor (calcium) increased its strength by 60 to 70% and improved the grindability of these steels by 20%. Micro-examination of the steels in question indicated that the carbides in them are more minute and are more uniformly distributed than in the initial steels. Some factors which increased the strength are the more fine grained and uniform structure of high speed steels, the formation of an extremely thin layer of liquid calcium precipitated in the cutting zone due to the high temperatures to which the cutting edge is heated (850 C) preventing adhesion wear, and the formation of finely dispersed zirconium carbides possessing a high negative value of free energy. S.L.

N83-26993# Polish Academy of Sciences, Warsaw. Dept. of Theory of Continuous Media.
KINETICS OF VOID FORMATION IN STRAINED METALS
Jerzy Krzeminski 1983 57 p refs
(ISSN-0208-5658) Avail: Issuing Activity

Metals and alloys develop an internal porosity in the form of small cavities when strained in tension at elevated temperature, exposed to irradiation, or subjected to diffusion experiments. Such cavities were essentially empty and were called "voids". Although the phenomenon of void formation is a topic of immense interest, it was considered only in recent years, and is still far from being fully understood. A hypothesis of vacancy microcrack origination in strained metals was proposed. The hypothesis was based on the qualitative similarity between the Griffith theory of brittle fracture and the process of phase transition. This similarity suggested the idea that a microcrack may be initiated in an analogous manner as a nucleus of a new phase, composed of a set of vacancies situated at neighbouring lattice points, and resembling a bubble in cavitation of liquids. Author

N83-26994# Naval Weapons Center, China Lake, Calif. Engineering Dept.
A STUDY OF SOLVENT AND AQUEOUS CLEANING OF FLUXES Final Report, 1979 - 1983
Donna Sanger and Kathryn Johnson Feb. 1983 113 p
(AD-A124950; NWC-TP-6427) Avail: NTIS HC A06/MF A01 CSCL 11/7

Rosin-based and non-rosion fluxes were tested for ionic cleanliness after processing in one of three systems: solvent vapor degreasing, in-line aqueous cleaning, or a combination of solvent vapor degreasing followed by a deionized water rinse. Solvents containing a large percentage of alcohol gave the best ionic cleanliness for event the most difficult to remove rosin-based fluxes. Water alone cannot remove non-rosin flux residue. Detergents removed ionic contamination from the rosin, mildly activated (RMA) and the non-rosion fluxes but were unable to clean rosin, activated (RA) fluxes to an acceptable level of cleanliness. Combination cleaning proved very effective for removal of rosin-based fluxes. Insulation resistance testing of detergent cleaned rosin-based fluxes showed no degradation of sample printed wiring board resistance characteristics. Non-rosin fluxes degraded board resistance to an unacceptable degree.
Author (GRA)

N83-26995# National Bureau of Standards, Washington, D.C. Materials Chemistry Div.
PASSIVE FILMS, SURFACE STRUCTURE AND STRESS CORROSION AND CREVICE CORROSION SUSCEPTIBILITY
Jerome Kruger, Joseph J. Ritter, and Gabrielle G. Long Feb. 1983 72 p refs Submitted for publication
(Contract NAonr-18-69)
(AD-A124879; NBSIR-83-2551) Avail: NTIS HC A04/MF A01 CSCL 11/6

The cathodic delamination of organic coatings from iron or steel undergoing corrosion is outlined. Ellipsometric studies carried out on these substrates protected by either collodion, acrylic lacquers, or polybutadiene indicate that dissolution of the interfacial oxide in the highly alkaline cathodic environment constitutes the predominant mode of delamination. The spatial development of cathodic areas is probed both ellipsometrically and through subcoating electrochemical pH measurements. GRA

N83-26996# Naval Postgraduate School, Monterey, Calif. Dept. of Mechanical Engineering.
A STUDY OF THE EFFECT OF INTERRUPTED QUENCHES ON A THERMOMECHANICALLY PROCESSED HIGH CARBON STEEL M.S. Thesis
Steven A. Barton Oct. 1982 77 p refs
(AD-A124985) Avail: NTIS HC A05/MF A01 CSCL 11/6

The effects of short quench interruptions on the percentage retained austenite and the hardness and microstructure were investigated for AISI 52100 steel. Effects were observed for two starting microstructures: an as-received, spheroidize-annealed material, and a fine-grained, warm rolled material. Results indicate that retained austenite and hardness were independent of the quench interruption temperature. The warm rolled material had a higher percentage retained austenite as well as a higher hardness for all quench interruption temperatures. This is attributed to a finer starting microstructure and the retention of refinement throughout the heat treatment process. Evidence of preferred orientation was found in the case of the material showing prior warm rolling. GRA

N83-26997# Brown Univ., Providence, R. I. Engineering Materials Research Lab.
MULTIAXIAL CREEP OF 2618 ALUMINUM UNDER PROPORTIONAL LOADING STEPS
Jow-Lian Ding and William N. Findley Nov. 1982 40 p refs
(Contract DAAG29-81-K-0138)
(AD-A125023; ARO-17741.2-EG; EMRL-88; TR-2) Avail: NTIS HC A03/MF A01 CSCL 11/6

Creep data of 2618-T61 aluminum alloy under multistep multiaxial proportional loadings at 200 degrees C (392 degrees F) are reported. Two viscoplastic flow rules were developed using constant stress creep and strain recovery data. One was based on the accumulated strain (strain hardening), and the other on a tensorial state variable (kinematic hardening). Data were represented by two models: a nonrecoverable viscoplastic model and a viscous-viscoelastic model in which the time-dependent strain was resolved into resolved into recoverable (viscoelastic) and nonrecoverable components. The modified superposition principles was used to predict the viscoelastic strain component under variable stress states for both models. The experiments showed that the viscous-viscoelastic model with either strain-hardening or kinematic hardening gave very good predictions of the material responses. Strain hardening was best in some step-down stress states. The viscoelastic component accounted for not only the recovery strain but also the transient creep strain upon reloadings and step-up loadings. GRA

N83-26998# Brown Univ., Providence, R. I. Engineering Materials Research Lab.
THE 48 HOUR MULTIAXIAL CREEP AND RECOVERY OF 2618 ALUMINUM ALLOY AT 200C
Jow-Lian Ding and William N. Findley Oct. 1982 43 p refs
(Contract DAAG29-81-K-0138)
(AD-A124993; EMRL-87; ARO-17741.1-EG; TR-1) Avail: NTIS HC A03/MF A01 CSCL 11/6

Data are reported from 48 hour constant multiaxial stress creep followed by 48 hour recovery with the magnitudes of the effective stress ranging from 34.5 MPa (5.00 ksi) to 175.5 MPa (25.46 ksi). They differed from a previous data set in the much longer

constant-stress durations and the inclusion of data from low stress creep, compression creep and short term aging tests. Data were represented by a viscous-viscoelastic model in which the time-dependent strain was resolved into recoverable and nonrecoverable components. Author (GRA)

N83-26999# California Univ., Berkeley. Dept. of Materials Science and Mineral Engineering.
A NEW CLASS OF STEELS FOR THICK-WALL PRESSURE VESSELS Final Technical Report, 21 Jun. 1980 - 30 Jun. 1982
P. N. Spencer, A. C. McGee, and E. R. Parker 1982 91 p refs
(Contract W-7405-eng-26)
(DE83-004101; UCB/RP-82/D1009) Avail: NTIS HC A05/MF A01

The objective is to develop a new class of steels that can be field fabricated into very large diameter, very thick wall, pressure vessels for coal gasification/liquefaction systems, and specifically to develop an Fe-C-V-Ni based alloy which, after a simple continuous cooling process (instead of quenching and tempering), would exhibit through thickness strength and toughness combinations comparable to those of commercially available pressure vessel steels and which at the same time would be less susceptible to hydrogen attack. Previous work included detailed studies of isothermally transformed Fe-C-V base alloys and preliminary investigations of continuously cooled steels. Results indicated that uniform microstructures with combinations of strength and toughness could be produced in a wide range of section thicknesses. From June 1980 through June 1981, emphasis was placed on investigating the effect on mechanical properties/microstructure relationships of different austenitization temperatures and different rates of continuous cooling of six Fe-C-V-Ni-Mu alloys. During the June 1981 to June 1982 period, an additional three Fe-C-V compositions including additions of Al, Si, or Mo were added to the list of alloys being investigated. In addition to evaluation of continuous cooling characteristics and VC dissolution and coarsening kinetics, emphasis was placed on hydrogen attack and weldability studies. DOE

N83-27000# Hanford Engineering Development Lab., Richland, Wash.
USE OF MICROHARDNESS TO DETERMINE THE STRENGTHENING AND MICROSTRUCTURAL ALTERATIONS OF 14-MeV-NEUTRON-IRRADIATED METALS
N. F. Panayotou Feb. 1982 18 p refs Presented at the Intern. Conf. on Neutron Irradiation Effects, Argonne, Ill., 8-12 Nov. 1981
(Contract DE-AC06-76FF-02170)
(DE82-014002; HEDL-SA-2529; CONF-811145-11) Avail: NTIS HC A02/MF A01

Microhardness was found to be an effective post-irradiation analytical tool. The hardening of recrystallized copper and type 316 stainless steel irradiated up to 10 to the 18th power n/sq cm, E = 14 MeV, at the Rotating Target Neutron Source (RTNS)-II was studied. It was determined that for these metals the increase in hardness varies directly with the measured increase in the 0.2 percent offset yield strength. Furthermore the coupled use of microhardness and transmission electron microscope techniques provides an estimate of the defect population which was not resolved by TEM. This estimate in turn, was used to evaluate the magnitude of the proportionality constant used in the strong barrier model of radiation induced hardening. DOE

N83-27001# Argonne National Lab., Ill. Applied Physics Div.
FAST-NEUTRON TOTAL AND SCATTERING CROSS SECTIONS OF ELEMENTAL PALLADIUM
A. B. Smith, P. T. Guenther, and J. F. Whalen Jun. 1982 27 p refs
(Contract W-31-109-eng-38)
(DE82-019475; ANL/NDM-71) Avail: NTIS HC A03/MF A01

Neutron total cross sections of palladium are measured from approximately 0.6 to 4.5 MeV with resolutions of approximately 30 to 70 keV at intervals of < 50 keV. Differential neutron elastic and inelastic scattering cross sections are measured from 1.4 to 3.85 MeV at intervals of 50 to 100 keV and at 10 to 20 scattering angles distributed between approximately 20 and 160 deg. The experimental results are compared with respective quantities given in ENDF/B-V and used to deduce an optical potential that provides a good description of the measured values. DOE

N83-27002# Pennsylvania Univ., Philadelphia. Dept. of Materials Science and Engineering.
MECHANISMS OF DAMAGE ACCUMULATION IN TIME-DEPENDENT CYCLIC DEFORMATION Progress Report, 1 Jan. - 31 Dec. 1982
Campbell Laird Aug. 1982 7 p refs
(Contract DE-AC02-80ER-10570)
(DE83-000993; DOE/ER-10570/T1) Avail: NTIS HC A02/MF A01

Two kinds of damage produced in cyclic creep were studied: (1) change in the dislocation density and arrangement, to be studied in copper and (2) damage phenomena perhaps involving precipitates in Cr-Mo-V rotor steel. In copper tested at low temperatures, strain bursts wee recognized for the first time in polycrystals of a pure metal in both cyclic and static creep. Cyclic stress-strain response in cyclic creep was defined, and a study of single crystals carried out in order to study better the dislocation structures associated with bursts. Because of its superior quality, a Westinghouse rotor steel was eventually chosen for detailed study. Effort was directed this year on the high temperature testing apparatus. High temperature tests were extended to lower amplitudes. DOE

N83-27003# Bendix Corp., Kansas City, Mo.
CONTINUOUS CABLE PROCESSING BY THE PHYSICAL VAPOR DEPOSITION TECHNIQUE
G. J. Hale Jan. 1983 40 p refs
(Contract DE-AC04-76DP-00613)
(DE83-006011; BDX-613-2893) Avail: NTIS HC A03/MF A01

A continuous cable processor (CCP) has been designed, built and tested to deposit aluminum or copper on 70-mm-wide polyimide film by the physical vapor deposited film can be better than 2%. Various equipment difficulties resulted in deposited films with thickness uniformities of + or - 1.4 to + or 12.9%. Deposit thicknesses up to 30 (SIGMA)m could be achieved in a single deposition. The present CCP equipment has design limitations that prevent films with a 4-(SIGMA)m coating thickness from being deposited more than 10 m in length in one continuous operation. Future activity will incorporate many new design features to achieve film lengths more than 10 m with thickness uniformities of + or - 2% or less. DOE

N83-27004# Westinghouse Electric Corp., Pittsburgh, Pa. Nuclear Technology Div.
EFFECTS OF HYDRAZINE AND pH ON THE CORROSION OF COPPER-ALLOY MATERIALS IN AVT ENVIRONMENTS WITH OXYGEN
D. G. Lorentz Dec. 1982 61 p refs Sponsored by EPRI
(EPRI Proj. S196-1)
(DE83-901124; EPRI-NP-2654) Avail: NTIS HC A04/MF A01

The impact of pH and hydrazine on release rates of CDA-706 (Cu/Ni: 90/10) and CDA-443-ADM (admiralty brass) was studied at typical plant conditions. Data from these tests was used to approximate the extent of corrosion transport. Tests on CDA-706 were performed at 274 and 3750 F. Tests on CDA-443-ADM were conducted at 1930F. The CDA-706 tests indicated that release rates increased with temperature and decreased with pH under the test conditions studied. The CDA-443-ADM tests displayed a parabolic shaped release rate curve with a minimum at about pH 9.05. A comparison between the two oxygen test values revealed that the higher oxygen tests resulted in the higher release rates for both of the feedwater materials. Likewise, test conditions with less than stoichiometric hydrazine values resulted in higher release rates as compared to test points with excess hydrazine. Due to the high release rates form both CDA-706 and CDA-443-ADM, these feedwater materials are not recommended for future use in feedwater heaters when there is concern for corrosion product transport. DOE

N83-27005# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.

AGING RESPONSE OF A WELDED IRON-BASED SUPERALLOY

Michael J. Strum, L. T. Summers, and J. W. Morris, Jr. Sep. 1982 22 p refs Presented at the Am. Soc. of Metals Meeting, St. Louis, Mo., 24 Oct. 1982

(Contract DE-AC03-76SF-00098)

(DE83-005856; LBL-14999; CONF-8210116-1) Avail: NTIS HC A02/MF A01

A persistent strength mismatch exists in autogenous JBK-75 weldments between base metal and weld metal regions. This is attributed to microstructural coarseness from the large columnar weld metal grains, and chemical segregation of Ti. Chemical segregation in the weld results in the rapid initial precipitation in Ti-enriched regions, and in slower hardness response due to a low density of precipitates in Ti-depleted regions. Slip localization occurs in the Ti-depleted dendritic regions relative to the enriched interdendritic regions, resulting in an easy-patch of deformation. Decreased weld microstructural coarseness or columnar grain size results in significant hardness increases. Weldment hardness levels are matched through postweld solution annealing treatments prior to aging. The magnitude of the weldment strength mismatch decreases at cryogenic temperatures. Weld metal segregation results in the formation of rich precipitates, believed to be the Chi (Chi) topographically close-packed phase, not present in the base metal. DOE

N83-27006# Arizona State Univ., Tempe.

ELECTRON EMISSION CHARACTERISTICS OF TUNGSTEN ALLOYS: MEE 492

Hee M. Moon 14 May 1982 15 p

(Contract DE-AC02-79ET-15419)

(DE83-006774; DOE/ET-15419/T4) Avail: NTIS HC A02/MF A01

A plasma anode tube was constructed to investigate the electron emission characteristics for rehenium, 1% thorium tungsten, and 2% thorium tungsten. The tube consists of cathode, anode, cesium reservoir, and three probes. Inside of the tube is a rough vacuum created by using a Varian liquid nitrogen cooled cryovalve and further vacuum was created by using a Varian absorption pump to 4 x IO(+5) pa. The tube was sealed off from the vacuum pump after the cesium ampoule was broken. The entire plasma anode tube except the cesium reservoir was placed in a furnace whose door was been modified to permit viewing of the tube. DOE

N83-27007# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.

HIGH-TEMPERATURE CORROSION OF IRON IN SULFUR-CONTAINING ATMOSPHERE

F. C. Yang and D. P. Whittle Oct. 1982 30 p refs Presented at the Symp. on Corrosion in Fossil Fuel Systems, Detroit, 17-21 Oct. 1982

(Contract DE-AC03-76SF-00098)

(DE83-006965; LBL-15470; CONF-821015-5) Avail: NTIS HC A03/MF A01

The simultaneous oxidation-sulfidation of pure iron in CO2-10%SO2 atmospheres was studied at 8710 C. Although thermodynamic calculations predict the formation of an oxide layer, complex product layers of oxide and sulfide porous structures are observed. The sulfide within the scale is formed due to depletion of oxygen adjacent to the scale/gas interface, shifting the thermodynamic equilibrium to a sulfide stable region. The scale consists of three layers. The outer layer is a magnetite matrix, containing sulfide-rich streaks and protrusions. The inner layer is a mixture of wustite and sulfide. At the scale/metal interface, there is a layer of large grains formed by inward diffusion of anions. The protrusions on the scale are though to be developed by the fast transport of iron ions through the sulfide-rich streaks. The wrinkles which spread all over the scale surface are due to grain boundary diffusion. Unbalanced diffusion is proposed to account for the formation of the porous structure. DOE

N83-27008# Massachusetts Inst. of Tech., Cambridge.

DYNAMIC POWDER COMPACTION OF RAPIDLY SOLIDIFIED PATH A ALLOY WITH INCREASED CARBON AND TITANIUM CONTENT

J. Megusar, D. Imeson, J. B. VanderSande, and N. J. Grant 1982 16 p refs

(Contract DE-AC02-78ER-10107)

(DE82-017252; DOE/ER-10107/13) Avail: NTIS HC A02/MF A01

The potential of the dynamic powder compaction technique to consolidate rapidly solidified Path A alloys and to develop microstructures with improved irradiation performance in the fusion environment is examined. Samples of rapidly solidified and dynamically compacted Path A alloy with increased carbon and titanium content were included in alloy development irradiation experiments. DOE

N83-27009# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.

COMPARISON OF NEUTRON AND HEAVY-ION DAMAGE IN A STABLE AUSTENITE

K. Farrell and N. H. Packan 1982 21 p refs Presented at the 11th Intern. Symp. on Effects of Radiation on Mater., Scottsdale, Ariz., 28 Jun. 1982

(Contract W-7405-eng-26)

(DE82-017369; CONF-820628-6) Avail: NTIS HC A02/MF A01

Damage microstructures are compared at a dose of 10 dpa in a high-purity Fe-Ni-Cr alloy after irradiation in EBR-II and after nickel ion bombardment at temperatures encompassing the peak swelling. The damage features are qualitatively similar, but there are less cavities in the ion bombarded specimens. Incorporation of helium during the ion bombardments improves but does not eliminate this discrepancy. The peak swelling is 2.5 times greater for the neutron irradiations. The upward shift in peak swelling temperature with damage rate is 125 K, and helium also raises the upper temperature limit for swelling in the ion bombardments. Ion bombardments can match a required level of neutron swelling when the appropriate temperature shift and dose equivalency are applied, but the quantitative microstructural aspects are not reproduced. A suggestion is made for mending this inadequacy. DOE

N83-27010# Oak Ridge National Lab., Tenn.

ANALYSIS OF ELEVATED-TEMPERATURE TENSILE AND CREEP PROPERTIES OF NORMALIZED AND TEMPERED 2-1/4 Cr-1 Mo STEEL

M. K. Booker, B. L. P. Booker, and R. W. Swindeman 1982 15 p refs Presented at the ASME Pressure Vessel and Piping Conf., Orlando, Fla., 27 Jun. 1982

(Contract W-7405-eng-26)

(DE82-018160; CONF-820601-23) Avail: NTIS HC A02/MF A01

The ferritic 2-1/4 Cr-1 Mo steel is an important construction material for elevated temperature applications worldwide. It is of particular interest for coal conversion pressure vessels. Tensile and creep data are presented for normalized and tempered 2-1/4 Cr-1 Mo steel from American, Japanese, British, French, and German sources. These include creep data obtained at temperatures from 427 to 600 C (800 to 1112 F) and tensile data from room temperature to 550 C (1022 F). Properties examined included yield strength, ultimate tensile strength, 50000h creep rupture strength, and .00005%/h creep strength. These properties are used in setting allowable stresses for Section VIII, Division 1, of the ASME Boiler and Pressure Vessel Code. The data were analyzed by using lot centered regression approaches that yielded expressions for the variations in the above properties with loading condition, as well as accounting for lot to lot variations in properties. DOE

N83-27011# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.

RESPONSE OF BAINITIC 2 1/4 Cr-1 Mo STEEL TO CREEP-FATIGUE LOADINGS AT 482 C

R. W. Swindeman and J. P. Strizak 1982 25 p refs Presented

at the ASME Pressure Vessel and Piping Conf., Orlando, Fla., 27 Jun. 1982
(Contract W-7405-eng-26)
(DE82-017445; CONF-820601-13) Avail: NTIS HC A02/MF A01

Creep-rupture, fatigue, and creep-fatigue tests were performed on 150 mm plate of bainitic 2 1/4 Cr-1 Mo steel at 482 C. Exploratory data to assess the sensitivity of the material to time dependent damage processes was investigated. Two material conditions were examined - stress relieved (SR) for 6 h at 662 C and simulated post weld heat treated (PWHT) for 28 h at 690 C. DOE

N83-27012# Lulea Univ. (Sweden). Div. of Metal Working.
POWDER FORGING OF COMPOUND STEELS, PART 1
Bjoern Aren 1982 27 p refs 2 Vol.
(TULEA-1982-16-Pt-1; ISSN-0347-0881) Avail: NTIS HC A03/MF A01

Compound bodies consisting of ductile and hardened material were studied in order to determine the effect of tensile stress perpendicular to the interfacial plane. Samples with sharp and diffuse interfaces were investigated. It is shown that compound structures with considerable interfacial strength can be produced by powder forging. High compound strength is favored by a sharp interface between regions of dissimilar material. Author (ESA)

N83-27013# Lulea Univ. (Sweden). Div. of Metal Working.
POWDER FORGING OF COMPOUND STEELS, PART 2
Bjoern Aren 1982 22 p refs 2 Vol.
(TULEA-1982-17-Pt-2; ISSN-0347-0881) Avail: NTIS HC A02/MF A01

Compound bodies made by powder forging of ductile mild steel and highly hardened alloyed steel were studied to determine the effect of tensile stress parallel to the interfacial plane. The compounds were examined in tensile and in three-point bend tests. It is shown that fractures nucleated in the hard structure zone are arrested by the ductile phase on reaching the interface. Compared with monolithic bodies of the two materials, the compound structure is advantageous for the geometries investigated. The improvement is due to the combination of hardness and ductility from the two base materials. Author (ESA)

N83-27014# Atomic Energy Research Establishment, Harwell (England). Materials Development Div.
A STATISTICAL APPROACH TO THE STUDY OF LOCALIZED CORROSION
D. E. Williams, C. Westcott, and M. Fleischmann (Southampton Univ., Engl.) Mar. 1983 15 p refs
(AERE-R-10832; HL83/806(C14)) Avail: NTIS HC A02/MF A01

The initiation of pitting corrosion of a stainless steel in dilute NaCl solution is approached via study of the statistics of ensembles of current time transients. The powerful effect on pit initiation of varying the conductivity and buffer capacity of the electrolyte is shown. The data is interpreted using very simple ideas to the need to establish and maintain gradients of potential end pH on the scale of the surface roughness of the specimen in order to initiate pits. Current fluctuations are related to fluctuations in the thickness of a solution boundary layer at the metal surface. A stochastic model for pit initiation is outlined. The model permits the derivation of the probabilities of birth and death of pits. A consistent interpretation also involves a critical age beyond which pits do not die and a precursor state which must be reached before a current increase is observed. Author

N83-27015# United Kingdom Atomic Energy Authority, Harwell (England). Metallurgy Div.
EFFECTS OF AGING ON THE DUCTILE-FRACTURE MECHANISM IN A HIGH-STRENGTH LOW-ALLOY STEEL (300M)
C. A. Hippsley and S. G. Druce Jan. 1983 42 p refs
(AERE-R-10783) Avail: NTIS HC A03/MF A01

Isothermal aging at 500 C of a quenched-and-tempered low-alloy steel (300M) was found to produce reductions in the resistance to ductile fracture, as measured by impact fracture upper-shelf energy, ductile fracture-toughness, and tensile ductility. In order to determine the mechanisms underlying this effect, the influence of aging on relevant material properties (i.e., matrix plastic flow behavior, and the morphology and chemistry of second-phase particles) was investigated, while a quantitative evaluation was made of the associated fractography. The segregation of phosphorus to carbide/matrix interfaces during aging was directly observed by scanning Auger spectroscopy, and was shown to be principally responsible for enhancing void nucleation at carbide particles. This observation was related to the fractographic and fracture-toughness consequences of aging through a qualitative model of the ductile fracture mechanism. Author

N83-27742# Atomic Energy of Canada Ltd., Chalk River (Ontario). Accelerator Physics Branch.
BRAZING TECHNIQUES AND ALLOYS FOR ACCELERATOR RF COMPONENTS
R. B. Turner and J. Ungrin *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 77-79 ref (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N83-27016*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CORRELATION OF COMPRESSIVE STRESS WITH SPALLING OF PLASMA SPRAYED CERAMIC MATERIALS
R. L. Mullen (Case Western Reserve Univ.), G. McDonald, R. C. Hendricks (Rensselaer Polytechnic Inst.), and M. M. Hofle 1983 18 p refs Presented at the 7th Ann. Conf. on Ceram. and Advan. Mater., Cocoa Beach, Fla., 16-23 Jan. 1983; sponsored by American Ceramic Society
(NASA-TM-83406; E-1684; NAS 1.15:83406) Avail: NTIS HC A02/MF A01 CSCL 11G

Ceramics on metal substrates for potential use as high temperature seals or other applications are exposed to forces originating from differences in thermal expansion between the ceramic and the metal substrate. This report develops a relationship between the difference in expansion of the ceramic and the substrate, defines conditions under which shear between the ceramic and the substrate occurs, and those under which bending forces are produced in the ceramic. The off-axis effect of compression forces resulting from high temperature plastic flow of the ceramic producing buckling of the ceramic is developed. Shear is associated with the edge or boundary stresses on the component while bending is associated with the distortion of an interior region. Both modes are significant in predicting life of the ceramic. Author

N83-27017*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SLOW CRACK GROWTH IN SPINEL IN WATER
Stephan Schwantes (George Washington Univ.) and Wolf Elber May 1983 45 p refs
(NASA-TM-85644; NAS 1.15:85644) Avail: NTIS HC A03/MF A01 CSCL 07D

Magnesium aluminate spinel was tested in a water environment at room temperature to establish its slow crack-growth behavior. Ring specimens with artificial flaws on the outside surface were loaded hydraulically on the inside surface. The time to failure was measured. Various precracking techniques were evaluated and multiple precracks were used to minimize the scatter in the static fatigue tests. Statistical analysis techniques were developed to determine the strength and crack velocities for a single flaw. Slow crack-growth rupture was observed at stress intensities as low as 70 percent of K sub c. A strengthening effect was observed in specimens that had survived long-time static fatigue tests. Author

N83-27018*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ULTRASONIC MIXING OF EPOXY CURING AGENTS
W. T. Hodges and T. L. StClair Apr. 1983 19 p refs
(NASA-TM-85643; NAS 1.15:85643; AVRADCOM-TR-83-B-3) Avail: NTIS HC A02/MF A01 CSCL 11I

A new technique for mixing solid curing agents into liquid epoxy resins using ultrasonic energy was developed. This procedure allows standard curing agents such as 4,4 prime-diaminodiphenyl sulfone (4,4 prime-DDS) and its 3,3 prime-isomer, (3,3 prime-DDS) to be mixed without prior melting of the curing agent. It also allows curing agents such as 4,4 prime-diaminodiphenyl sulfone (4,4 prime-DDS) and its 3,3 prime-isomer, (3,3 prime-DDS) to be mixed without prior melting of the curing agent. It also allows curing agents with very high melt temperatures such as 4,4 prime-diaminobenzophenone (4,4 prime-DABP) (242 C) to be mixed without premature curing. Four aromatic diamines were ultrasonically blended into MY-720 epoxy resin. These were 4,4 prime-DDS; 3,3 prime-DDA; 4,4 prime-DABP and 3,3 prime-DABP. Unfilled moldings were cast and cured for each system and their physical and mechanical properties compared. Author

N83-27019*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PROCESSING OF FUSED SILICIDE COATINGS FOR CARBON-BASED MATERIALS
James L. Smialek [1982] 39 p refs Presented at the Ceramic-Metal Systems Div. Conf. of the Am. Ceramic Soc. Meeting, Cocoa Beach, Fla., 19-24 Jan. 1983
(NASA-TM-83362; E-1624; NAS 1.15:83362) Avail: NTIS HC A03/MF A01 CSCL 11C

The processing and oxidation resistance of fused Al-Si and Ni-Si slurry coatings on ATJ graphite was studied. Ni-Si coatings in the 70 to 90 percent Si range were successfully processed to melt, wet, and bond to the graphite. The molten coatings also infiltrated the porosity in graphite and reacted with it to form SiC in the coating. Cyclic oxidation at 1200 C showed that these coatings were not totally protective because of local attack of the substrate, due to the extreme thinness of the coatings in combination with coating cracks. S.L.

N83-27020*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
RF SPUTTERED SILICON AND HAFNIUM NITRIDES: PROPERTIES AND ADHESION TO 440 C STAINLESS STEEL
A. Grill (Ben Gurion Univ. of the Negev, Beer Sheva, Israel) and P. R. Aron [1982] 11 p refs Presented at the Intern. Conf. on Met. Coatings, San Diego, Calif. 18-22 Apr. 1983; sponsored by Am. Vacuum Soc.
(NASA-TM-83400; E-1677; NAS 1.15:83400) Avail: NTIS HC A02/MF A01 CSCL 11G

Silicon nitride and hafnium nitride coatings were deposited by reactive RF sputtering on oxidized and unoxidized 440 C stainless steel substrates. Sputtering was done in mixtures of argon and nitrogen gases from pressed powder silicon nitride and from hafnium metal targets. Depositions were at two background pressures, 8 and 20 mtorr, and at two different fractions (f) of nitrogen in argon, 0.25 and 0.60, for hafnium nitride and at f = 0.25 for silicon nitride. The coatings and the interface between the coating and substrates were investigated by X-ray diffractometry, scanning electron microscopy, energy dispersive X-ray analysis and Auger electron spectroscopy. A Knoop microhardness of 1650 + or - 100 kg/sq mm was measured for hafnium nitride and 3900 + or - 500 kg/sq mm for silicon nitride. The friction coefficients between a 440 C rider and the coatings were measured under lubricated conditions. Scratch test results demonstrate that the adhesion of hafnium nitride to both oxidized and unoxidized 440 C is superior to that of silicon nitride. Oxidized 440 C is found to have increased adhesion, to both nitrides, over that of unoxidized 440 C. Author

N83-27021*# Georgia Inst. of Tech., Atlanta. School of Mechanical Engineering.
NASA INTERDISCIPLINARY COLLABORATION IN TRIBOLOGY. A REVIEW OF OXIDATIONAL WEAR Final Report
Terence F. J. Quinn Washington NASA Jun. 1983 113 p refs (Contract NCC3-14)
(NASA-CR-3686; E-1573; NAS 1.26:3686) Avail: NTIS HC A06/MF A01 CSCL 11F

An in-depth review of oxidational wear of metals is presented. Special emphasis is given to a description of the concept of oxidational wear and the formulation of an Oxidational Wear Theory. The parallelism between the formation of an oxide film for dry contact conditions and the formation of other surface films for a lubricated contact is discussed. The description of oxidational wear is prefaced with a unification of wear modes into two major classes of mild and severe wear including both lubricated and dry contacts. Oxidational wear of metals is a class of mild wear where protective oxide films are formed at real areas of contact and during the time of contact at temperataure T sub c. When the oxide reaches a critical thickness, frequently in the range of 1 to 3 microns, the oxide breaks up and eventually appears as a wear particle. These oxides are preferentially formed on plateaux which alternately carry the load as they reach their critical thickness and are removed. If the system is operated at elevated temperatures, thick oxides can form both out of contact and between the plateaux. Temperature is important in determining the structure of the oxide film present. Spinel oxide (Fe3O4) which forms above 300 C is more protective than the lower temperature rhomobohedral (alpha-Fe2O3) oxide which is abrasive. An Oxidational Wear Theory is derived using a modified Archard wear law expressed in terms of activation energy (Qp) and Arrhenius constant (Ap). S.L.

N83-27022*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THERMAL-BARRIER COATINGS FOR UTILITY GAS TURBINES Final Report
S. R. Levine and R. A. Miller Sep. 1982 66 p refs Sponsored by EPRI
(EPRI Proj. 1039)
(NASA-TM-85349; NAS 1.15:85349; DE83-900154; EPRI-AP-2618) Avail: NTIS HC A04/MF A01 CSCL 11B

The potential of thermal barrier coatings for use in utility gas turbines was assessed. Pressurized passage and ambient pressure doped fuel burner rig tests revealed that thermal barrier coatings are not resistant to dirty combustion environments. However, present thermal barrier coatings, such as duplex partially stabilized zirconia and duplex Ca2SiO4 have ample resistance to the thermo-mechanical stress and temperature levels anticipated for heavy duty gas turbines firing clean fuel as revealed by clean fuel pressurized passage and ambient pressure burner rig tests. Thus, it is appropriate to evaluate such coatings on blades, vanes and combustors in the field. However, such field tests should be backed up with adequate effort in the areas of coating application technology and design analysis so that the field tests yield unequivocal results. M.G.

N83-27023# Los Alamos Scientific Lab., N. Mex.
MOLECULAR-ORBITAL CALCULATIONS FOR POLY-NITROPOLYHEDRANES
J. P. Ritchie 1982 31 p refs Presented at Seminar on High Density Energetic Maters., Dover, N. J., 11 May 1982
(Contract W-7405-eng-36)
(DE82-018390; LA-UR-82-1841; CONF-820598-1) Avail: NTIS HC A03/MF A01

Various synthetic pathways to polyhedranes are being evaluated by using theoretical calculations. The results indicate that the synthesis of tetranitrotetrahedrane from tetralighiotetrahedrane is not a promising route. Alternately, sequential base promoted nitrations of cubanes seem a much more promising route for obtaining polynitrocubanes. DOE

N83-27024# Fluorochem, Inc., Azusa, Calif.
RESEARCH IN ENERGETIC COMPOUNDS Interim Summary Report, 1 Jan. - 31 Dec. 1982

Kurt Baum and Thomas C. Archibald Oct. 1983 61 p refs
(Contract N00014-78-C-0147)
(AD-A124911; Rept-2-5-ONR) Avail: NTIS HC A04/MF A01 CSCL 07/3

Reaction parameters for the polymerization of 3-azidooxetane, catalyzed by boron trifluoride, were investigated. No significant improvements over the previously attained yields (about 50%) resulted from variations of temperature, catalyst level, water content or the use of 1,4-butanediol as a cocatalyst. Increasing the monomer concentration from 20% to 50%, however, gave 80-90% yields of polymer. 2-Aminoadamantane, prepared from 2-adamantanone and sodium cyanoborohydride, was oxidized to give 2-nitroadamantane. The reaction of 4-bromo-2,2-dinitroadamantane with sodium azide gave 4-azido-2-adamantanone. Nitration of 2,4-adamantanedione dioxime gave the internal nitroso dimer of 2,4-dinitro-2,4-dinitrosoadamantane. Reaction of 2,6-adamantanedione dioxime with NBS gave 2,6-di-bromo-2,6-dinitroadamantane. Debromination with sodium borohydride, followed by nitration with tetranitromethane, gave 2,2,6,6-tetranitro-adamantane. The reaction of bicyclo(3,3,1)nona-2,6-dione dioxime with hypochlorous acid gave a chlorohydrocarbon, but reaction of the dioxime with chlorine gave 2,6-dichloro-2,6-dinitrosobicyclo(3,3,1)nonane. This nitroso compound reacted with hypochlorous acid to give 2,6-dichloro-2,6-dinitrobicyclo(3,3,1)nonane. 2,6-Diaminobicyolo(3,3,1)nonane, obtained from bicyclo(3,3,1)nona-2,6-dione and sodium cyanoborohydride was oxidized to the 2,6-dinitro derivative. GRA

N83-27025# Cincinnati Univ., Ohio. Dept. of Materials Science and Metallurgical Engineering.
PHASE EQUILIBRIA AND TRANSITION IN MIXTURES OF A HOMOPOLYMER AND A BLOCK COPOLYMER. 2: THE PHASE DIAGRAM
R. J. Roe and W. C. Zin 26 Jan. 1983 37 p refs Submitted for publication
(Contract N00014-77-C-0376; NR Proj. 356-655)
(AD-A124929; TR-7) Avail: NTIS HC A03/MF A01 CSCL 07/4

The phase relationship in mixtures containing a block copolymer and a homopolymer has been studied by means of light scattering. The copolymer employed is a styrene-butadiene block copolymer of molecular weight (Mw) 28000, containing 27% styrene. The homopolymer in the mixture is either (1) polystyrene of Mw 2400, (2) polystyrene of Mw 3500, or (3) polybutadiene of Mw 26000. The first system containing the lower molecular weight polystyrene was previously studied in detail also by means of small-angle X-ray scattering. The observed cloud points show a change with temperature in the limit of solubility of the homopolymers in the block copolymer, which has an ordered, microdomain structure at low temperatures but a disordered, homogeneous structure at high temperatures. The observed solubility limits at low temperatures turn out to be greater, by an order og magnitude, than the prediction based on an earlier block copolymer theory. The phase diagram, constructed on the basis of the light and X-ray scattering data, is rich in features and resembles the complex phase diagrams often observed with binary metal alloys. Author (GRA)

N83-27026# Virginia Polytechnic Inst. and State Univ., Blacksburg. College of Engineering.
THERMO-MECHANICAL AND THERMAL BEHAVIOR OF HIGH-TEMPERATURE STRUCTURAL MATERIALS Interim Report, 1 Jan. - 31 Dec. 1982
D. P. Hasselman, M. M. Abraham, G. R. Angell, I. D. Bentsen, and M. A. Buckman 31 Dec. 1982 219 p refs
(Contract N00014-78-C-0431)
(AD-A125242) Avail: NTIS HC A10/MF A01 CSCL 11/2

Technical ceramics because of their chemical inertness, high melting point, good wear resistance, excellent stability at high temperature and other unique properties, represent a class of materials eminently suited for many critical engineering applications. Unfortunately, because of their brittleness and unfavorable combination of pertinent material properties, technical ceramics generally are highly susceptible to catastrophic failure in non-uniform thermal environments, which give rise to thermal stresses of high magnitude. Thermal stress failure analysis of structural materials represents a multi-disciplinary problem which involves the principles of heat transfer, mechanics and materials engineering. Over the last few decades much general understanding of the nature of thermal stress failure of brittle materials has been generated. However, due to the multi-disciplinary nature of the problem, the ability to predict thermal stress failure quantitatively for design or other purposes has lagged behind the progress made in other engineering fields. The objective of the present program is to improve the qualitative and quantitative understanding of the nature of thermal stress failure of brittle structural materials, including the experimental as well as theoretical variables. In order to achieve this objective, the participating investigators and scope of the program are organized such that full advantage is taken of the combine inputs from a number of engineering disciplines. In a similar spirit, a number of studies were conducted in cooperation with investigators at other institutions. GRA

N83-27027# Akron Univ., Ohio. Inst. of Polymer Science.
ROLE OF AMINES IN ADHESION OF POLYBUTADIENE TO GLASS SUBSTRATES. 1: REACTIONS OF AMINES DURING PEROXIDE CURING OF POLYBUTADIENE
Y. Eckstein and P. Dreyfuss Oct. 1982 30 p refs
(Contract N00014-76-C-0408)
(AD-A121685; TR-22-1) Avail: NTIS HC A03/MF A01 CSCL 09/1

An attempt to elucidate the role of amines in general, and of 3-amino-propyltriethoxysilane in particular, has been made through a study of the title subject by several different approaches. This paper describes the interactions of amines during curing of the rubber phase. When aromatic or cyclic amines were added, maximum stress at break and minimum swelling ratios were observed when the number of alkoxide radicals generated was equal to the number of hydrogen atoms on the nitrogen of the amines. The order of reactivity was thus no amine < aniline < piperazine < m-phenylenediamine. The greatest effect of aliphatic amines also occurred when the concentration of primary amino groups was equal to the concentration peroxide; but the behavior was complex and dependent on the backing against which samples were molded. The higher rigidity and reinforcement of the polybutadiene in the presence of low concentrations of amines was attributed to formation of chemical bonds between the amines and the polybutadiene. GRA

N83-27028# Akron Univ., Ohio. Inst. of Polymer Science.
ROLE OF AMINES IN ADHESION OF POLYBUTADIENE TO GLASS SUBSTRATES. 4: THE EFFECT OF AMINE STRUCTURE AND CONCENTRATION ON THE STRENGTH OF ADHESION
Y. Eckstein and P. Dreyfuss Oct. 1982 23 p refs
(Contract N00014-76-C-0408)
(AD-A121686; TR-25-4) Avail: NTIS HC A02/MF A01 CSCL 09/1

An attempt to elucidate the role of amines in general, and of 3-amino-propyltriethoxysilane in particular, has been made through a study of the title subject by several different approaches. This paper describes the effect of amine structure and concentration on the strength of adhesion of peroxide cured polybutadiene to a glass surface. It demonstrates that adhesion of polybutadiene to glass surfaces is enhanced by incorporation of small amounts of amines into the elastomer. An 80-fold increase in the work of adhesion was observed in the presence of 3-aminopropyltrimethyoxysilane. The results are interpreted in terms of information reported in previous papers in this series. GRA

N83-27029# Florida State Univ., Tallahassee. Inst. of Molecular Biophysics.
POLYMERS IN MECHANICAL SYSTEMS: STRUCTURE-PROPERTY REQUIREMENTS
1983 21 p refs
(Contract DE-AS05-80ER-10655)
(DE83-005590; DOE/ER-10655/4) Avail: NTIS HC A02/MF A01

Key physical and physical chemical properties of polymeric systems which are related to their use as working substances in

mechanochemical systems were examined. Attention was focused on the crystal liquid phase transition and on the properties of semicrystalline polymers. Melting crystallization under an applied external force was examined. The equilibrium melting temperature stress relations and the associated problem of crystallization kinetics under an applied external stress were areas of concern. Mechanical properties, with particular emphasis on the influence of the morphological and structural variables which describe the semicrystalline state were addressed. An understanding of the structural factors and crystallization conditions by which these features are identified, isolated and quantitatively measured were described. The properties studied are dynamic mechanical and related relaxation processes, stress strain, draw ratio and ultimate tensile strength. DOE

N83-27030# Rolls-Royce Ltd., Derby (England).
INTERACTION OF CERAMICS WITH MOLTEN MATERIALS DURING DIRECTED CRYSTALLIZATION
Yu. F. Karpovich, G. M. Glezer, I. M. Demonis, and V. M. Stepanov 9 Aug. 1982 5 p Transl. into ENGLISH of Spets. Sposoby Litya (USSR), v. 4, 1982 p 22-23
(PNR-90155; Trans-16372/TLT-00899) Avail: NTIS HC A02/MF A01

The X-ray, chemical and metallographic analysis of the composition of modified layers of electrocorundum molds after prolonged contact with molten material and with the metal oxide layer formed on the surface of the cast material is discussed. The Cr content of damaged surface layers drops to 4.5% to 6% (from 8% to 9% before casting). The presence of carbon in the melt reduces chromium depletion. Preliminary saturation of the electrocorundum with chromium slows, or prevents transfer of chromium from the melt to the ceramic material. Author (ESA)

N83-27031# Atomic Energy Research Establishment, Harwell (England). Materials Development Div.
THE BENEFICIATION OF POWER STATION COAL ASH AND ITS USE IN HEAVY CLAY CERAMICS
M. Anderson and G. Jackson Jan. 1983 21 p refs
(AERE-R-10806; HL83/146(C14)) Avail: NTIS HC A02/MF A01

Differences in the carbon content and the bulk density of pulverized fuel ash produced by coal-burning electric power plants, and the magnitude of these variations are considered. The influence of out-of-the-hopper material on the properties of the ash/clay mixes is examined and methods for overcoming the problem are addressed. The operation of boilers in a power station is outlined in an effort to explain the inherent short-run variability of ash.
Author

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N83-27032# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ANALYTICAL DESIGN FOR INTERNAL BURNING STAR GRAINS OF SOLID ROCKETS
Chang-Tang Lu 19 Jan. 1983 13 p refs Transl. into ENGLISH from Lixue Xuebao (China), no. 2, 1979 p 182-188
(AD-A124826; FTD-ID(RS)T-1603-82) Avail: NTIS HC A02/MF A01 CSCL 21/9

With regard to the design of internal burning star grains of solid rocket engines, they have been frequently designed based on pure geometrical studies and their corresponding trial methods. The formula and computation curves shown are representative of those which are widely used in engineering design and scientific studies. Actual practice showed that the pure geometrical formula and curves given are not only too complex, but also incomplete. The corresponding trial method not only involves a huge computational load, but also is rather blind. It is very difficult to ensure various technical objectives. It is extremely difficult to reach the optimum design. Analytical design is used to replace trial design. Different from the traditional pure geometrical studies, the various geometrical parameters of the internal star, the various characteristic parameters of the solved propellant and the technical objectives of the engine are combined to establish the grain design equation series according to the optimization principle of grain design. GRA

N83-27033# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Aerospace and Ocean Engineering.
INJECTION, ATOMIZATION, IGNITION AND COMBUSTION OF LIQUID FUELS IN HIGH-SPEED AIR STREAMS Final Report, 1 Dec. 1978 - 30 Nov. 1981
Joseph A. Schetz Nov. 1982 25 p
(Grant AF-AFOSR-3485-78; AF Proj. 2308)
(AD-A125237; VPI-AERO-130; AFOSR-83-0025TR) Avail: NTIS HC A02/MF A01 CSCL 21/2

Experimental studies of the penetration, break-up and atomization of transverse liquid and slurry jets were performed. All tests were with an air cross flow at Mach 3.0 with Po = 4 atm. and To = 300 deg K. The processes studied were: (1) the effects of injectant viscosity and surface tension, (2) the performance of an impinging jet injector and (3) the effects of particle loading for a slurry jet with 3-50 micrometer particles. The diffractively scattered light method was employed at these high-density, supersonic conditions to study droplet sizes. The major results are, (1) mean droplet size is approximately 10 microns for injectors of 0.05 in., (2) it has an inverse relation with jet/free stream dynamic pressure ratio, (3) it has a direct relation with orifice diameter, (4) it decreases downstream, (5) transverse variation has no simple pattern and (6) droplet size increases with viscosity. GRA

N83-27034# Naval Postgraduate School, Monterey, Calif.
AN INVESTIGATION OF THE EFFECTIVENESS OF SMOKE SUPPRESSANT FUEL ADDITIVES FOR TURBOJET APPLICATIONS M.S. Thesis
John Robert Bramer Oct. 1982 72 p refs
(AD-A125025) Avail: NTIS HC A04/MF A01 CSCL 21/5

Seven fuel additives were tested to investigate their effectiveness at reducing exhaust stack gas opacity in a turbojet test cell. Exhaust particle sizes and mass concentrations were determined at the engine and stack exhausts using measurements of light transmittance at three frequencies. Particle samples were also collected at the engine exhaust and measured with a scanning electron microscope to verify the optical technique. Nitrous oxide emissions were measured at the test cell stack exhaust. Four of the additives tested were found effective at reducing stack exhaust opacity and particulate mass concentration. None of the additives had any measurable effect on particle diameters. No meaningful changes in particle size or mass occurred between the engine and stack exhausts. The optical technique for determining particle size was verified effective using the scanning electron microscope. No additive had any significant effect on nitrous oxide production.
Author (GRA)

N83-27035# California Univ., Riverside. Pollution Research Center.
HIGH ALTITUDE JET FUEL PHOTOCHEMISTRY Final Report, Nov. 1980 - Sep. 1982
Arthur M. Winer, Roger Atkinson, William P. L. Carter, William D. Long, Sara M. Aschmann, and James N. Pitts, Jr. Tyndall AFB, Fla. Air Force Engineering and Services Center Oct. 1982 164 p refs
(Contract F08635-80-C-0359; AF Proj. 1900)
(AD-A125035; AFESC/ESL-TR-82-38) Avail: NTIS HC A08/MF A01 CSCL 21/4

Military jet aircraft flight procedures make it necessary to jettison excess fuel in the event of certain in-flight operational situations. These fuel expulsions can be sizable, and in the presence of sunlight and NOx emissions from engine exhaust there exists the potential for formation of ozone and other manifestations of

photochemical smog. Since these fuel dumping procedures are carried out at elevated altitudes the atmospheric properties involved are significantly different from those at ground level. Author (GRA)

N83-27036# Mueller Associates, Inc., Baltimore, Md.
STATUS OF ALCOHOL FUELS UTILIZATION TECHNOLOGY FOR HIGHWAY TRANSPORTATION: A 1981 PERSPECTIVE. VOLUME 2: COMPRESSION-IGNITION ENGINES
Nov. 1982 129 p refs
(Contract DE-AC05-79CS-56051)
(DE83-008127; DOE/CS-56051/8-Vol-2) Avail: NTIS HC A07/MF A01

The current status of the technologies of alcohol utilization in highway transportation diesel engines is reviewed. The use of methanol, ethanol, and certain of their derivatives in diesel engine powered vehicles is treated in this volume. The results of engine, vehicle and fuels testing are summarized. The topics of fuel properties, power output, fuel consumption, thermal efficiency, ignition delay, rate of pressure rise, engine noise, operability, exhaust emissions, smoke, materials compatibility, engine wear, and safety are discussed based on the data available at this time. The status of the technology at the time of the last comprehensive survey (1978) is summarized and discussed. Significant advances made since that time are delineated, as are remaining information gaps and areas in which more extensive investigation is still needed. DOE

N83-27037# Mason and Hanger-Silas Mason Co., Inc., Amarillo, Tex.
CORNER-TURNING CHARACTERISTICS OF TATB/HMX/Kel-F MIXTURES
Thomas L. Stallings, A. Gordon Osborn, and George T. West Jan. 1983 14 p
(Contract DE-AC04-76DP-00487)
(DE83-006931; MHSMP-83-03; PDE-101) Avail: NTIS HC A02/MF A01

A factorial experiment was conducted to determine the effects of HMX content, HMX particle size and TATB particle size in TATB/HMX-Kel-F formulations containing 5% by weight Kel-F 800 binder on corner turning performance at ambient and -54 C. TATB and HMX particle size variations did not significantly affect differences in corner turning performance between the two temperatures. With increasing HMX contents the effect of temperature on corner turning became less and at the maximum HMX content studied, 25%, the corner turning levels were almost equal at ambient and -54 C. DOE

N83-27038# Los Alamos Scientific Lab., N. Mex.
OBLIQUE INTERACTIONS OF DETONATION WAVES WITH EXPLOSIVE/METAL INTERFACES
J. M. Walsh Dec. 1982 18 p refs
(Contract W-7405-eng-36)
(DE83-007119; LA-9612-MS) Avail: NTIS HC A02/MF A01

The interaction of a detonation wave with an explosive/metal interface is considered. Theoretical models are discussed, and calculated results are given for PBX 9501 onto uranium, tantalum, copper, 304 stainless steel, aluminum, and nickel. For PBX 9501 onto aluminum and copper, regular shock reflection (in the PBX 9501) at small angles changes to regular rarefaction reflection (Prandtl-Meyer flow) at large angles, and the curve of metal shock pressure vs incidence angle is smooth. For the other metals, there is a discontinuity in shock pressure where low angle, regular reflection transists to Mach reflection, and a smaller discontinuity where the Mach reflection changes back to high angle regular reflection. DOE

N83-27039# Dynatech R/D Co., Cambridge, Mass.
DEVELOPMENT OF A BIOCHEMICAL PROCESS FOR PRODUCTION OF ALCOHOL FUEL FROM PEAT Progress Report, 1 Jun. 1981 - 31 May 1982
P. F. Levy, J. E. Sanderson, S. R. deRiel, and D. L. Wise 11 Jun. 1982 93 p refs
(Contract DE-AC02-81ER-10914)
(DE82-016692; DOE/ER-10914/1) Avail: NTIS HC A05/MF A01

The process has four major steps - pretreatment to promote biodegradability, anaerobic fermentation to produce organic acids, electrolytic oxidation of the organic acids to olefins, and hydration of the olefins to alcohols. Experimental (laboratory-scale) development work is pursued in three phases of the process. Experimental procedures and results to date on the pretreatment of peat, anaerobic fermentation of pretreatment peat and model compounds, and the electrolytic oxidation of organic acids to olefins are discussed. The hydration of olefins to form alcohols is already a commercial technology. The continued development studies for the second year of this program are also outlined. A preliminary economic assessment of the process was made based on available experimental data and reasonable assumptions for operating parameters and conversion rates. DOE

N83-27040# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.
HYDROGEN DERIVED FROM AMMONIA: SMALL-SCALE COSTS
Gerald Strickland Mar. 1982 13 p refs Presented at the 4th World Hydrogen Energy Conf., Pasadena, Calif., 13-17 Jun. 1982
(Contract DE-AC02-76CH-00016)
(DE82-012720; BNL-31009; CONF-820605-17) Avail: NTIS HC A02/MF A01

A systems study was made to assess the economic prospects for using purchased industrial ammonia as a hydrogen distribution and storage medium for users requiring 0.93 to 9.34 million std cubic m/y of hydrogen (33 to 330 million std cubic ft./y). Projected costs to the end user were determined for: the product of dissociated ammonia (N2 + H2/NH3), and the 99.999% pure H2 obtained by separation of the nitrogen (H2/NG); electrolytic hydrogen (EH2); purchased (merchant) liquid hydrogen (LH2); OTEC (ocean thermal energy conversion) LH2; as well as OTEC NH3 and the H2 products derived from it. Future costs are projected as dollars/GJ and as dollars/MBTU (1980 dollars in 1990) using two sets of forecast energy prices. DOE

N83-27041# California Univ., Livermore. Lawrence Livermore Lab.
SUMMARY OF IGNITION AND GROWTH MODELING OF SHOCK INITIATION AND DELAYED DETONATION IN FULL-DENSITY AND POROUS PROPELLANTS
C. M. Tarver 14 Feb. 1983 18 p refs
(Contract W-7405-eng-48)
(DE83-007405; UCID-19699) Avail: NTIS HC A02/MF A01

The current status of the propellant modeling effort, a physically consistent model of ignition and growth of reaction in full density and porous propellants was developed that yields good simulations of shock initiations and XDT phenomena in various geometries, but can not as yet satisfactorily explain the shock initiation process that occurs in the porous compaction process in DDT experiments. The limitations of a model extrapolated from shock initiation processes to low pressure and slow compression rate processes were demonstrated, and a more complete description of the processes involved in DDT has to be developed to accurately model the piston compaction experiment. DOE

N83-27042# California Univ., Livermore. Lawrence Livermore Lab.
IR EMISSION MEASUREMENTS OF SHOCKED ROCKET PROPELLANTS BY TIME-RESOLVED INFRARED RADIOMETRY
W. G. VonHolle 14 Feb. 1983 22 p refs
(Contract W-7405-eng-48)
(DE83-007356; UCID-19726) Avail: NTIS HC A02/MF A01

The application of time resolved radiometry to the study of SDT in VRP, VOY, FKM and ALTU-16 was summarized. Some of the data was previously reported. An attempt is made to intergrate and correlate all the data in order to arrive at conclusions about the effect of the composition of these propellants on their response to shock stimulus. These propellants were chosen to represent extremes of sensitivity and composition. After a brief description

of the gun experiments, the bare propellants results are discussed, followed by KCl overlay experiments. Finally, shredded VRO-2B gun impact experiments which were done to elucidate the nature of the reactions occurring in porous systems, important for understanding DDT and XDT, are described. Results of infrared radiometry experiments have procided time resolved temperature and fraction reacted data for a series of shocked propellants with different composition. DOE

N83-27043# Sandia Labs., Albuquerque, N. Mex.
SHOCK-WAVE RESPONSE OF TITANIUM SUNHYDRIDE-POTASSIUM PERCHLORATE
S. A. Sheffield and A. C. Schwa 1982 19 p refs Presented at the 8th Intern. Pyrotechnics Symp., Steamboat Springs, 12 Jul. 1982
(Contract DE-AC04-76DP-00789)
(DE82-016739; SAND-82-0489C; CONF-820710-9) Avail: NTIS HC A02/MF A01

Shock initiation of pyrotechnic materials is increasingly more interesting since this concept is now used in weapon component design. Several types of shock initiation experiments on TiH065/KC104 to better understand its shock response and the process by which it undergoes reaction were conducted. Gas gun impact experiments led to new unreacted Hugoniot information which was used, along with earlier reported data, to construct an equation of state for the unreacted material. Particle velocity records of the projectile impact interface and the shock transmitted through the sample show little evidence of reaction in the first microsecond even for 6 GPa shocks. Peculiarities in the waveforms at later times suggest some evidence of reaction although the experiments do not remain strictly one dimensional long enough to make definite statements. DOE

N83-27044# Sandia Labs., Albuquerque, N. Mex. Explosive Materials Div.
EFFECTS OF PARTICLE CHARACTERISTICS ON PERFORMANCE OF RRSK PETN
J. W. Rogers, Jr. and A. A. Duncan (Mason and Hanger-Silas Mason Co., Inc., Amarillo, Tex.) Jun. 1982 62 p refs
(Contract DE-AC04-76DP-00789)
(DE82-018553; SAND-81-2199) Avail: NTIS HC A04/MF A01

A particle characterization of production lots of RR5K PETN was completed. Prediction models were derived which identify those particle characteristics which influence sensitivity and performance. Those factors which have a positive influence threshold burst current were also found to have a positive influence on transit time. The models may be useful in screening new lots of PETN prior to test firing. In general, large distributions of shapes and sizes, with the larger particles being needle like or elongated lead to low threshold burst currents and short transit times. The threshold burst current was also found to be inversely proportional to the temperature at which the units were test fired. DOE

N83-27045# Los Alamos Scientific Lab., N. Mex.
THERMOCHEMISTRY OF MIXED EXPLOSIVES
Joan L. Janney and Raymond N. Rogers 1982 9 p refs Presented at the 7th Intern. Conf. on Thermal Analysis, Kingston, Canada, 22 Aug. 1982 Sponsored in part by the Army Armament Research and Development Command
(Contract W-7405-eng-36)
(DE82-012149; LA-UR-82-887; CONF-820809-3) Avail: NTIS HC A02/MF A01

In order to predict thermal hazards of high-energy materials, accurate kinetics constants are determined. Predictions of thermal hazards for mixtures of high-energy materials require measurements on the mixtures, because interactions among components are common. A differential-scanning calorimeter (DSC) is used to observe rate processes directly, and isothermal methods enable detection of mechanism changes. Rate-controlling processes will change as components of a mixture are depleted, and the correct depletion function must be identified for each specific stage of a complex process. A method for kinetics measurements on mixed explosives can be demonstrated with Composition B is an approximately 60/40 mixture of RDX and TNT, and is an important military explosive. Kinetics results indicate that the mator process is the decomposition of RDX in solution in TNT with a perturbation caused by interaction between the two components. DOE

N83-27046# Pennsylvania State Univ., University Park. Coal Research Section.
RELATION OF COAL CHARACTERISTICS TO LIQUEFACTION BEHAVIOR. PART 2: CONTINUOUS FLOW REACTOR STUDIES BY GULF RESEARCH AND DEVELOPMENT CO. Final Technical Report, Jul. 1976 - Feb. 1981
P. H. Given, W. Spackman, A. Davis, P. L. Walker, H. L. Lovell, M. M. Coleman, and P. C. Painter May 1982 162 p refs
(Contract DE-AC22-76ET-10587)
(DE82-016938; DOE/ET-10587/T1-Pt-2; FE-2494-FR-2) Avail: NTIS HC A08/MF A01

Gulf's 1000 gm/h continuous flow reactor (the A-1 Unit) was used for all experiments, and a number of product analyses were performed. Generating data in a continuous flow liquefaction reactor operated with a process derived solvent is a quite complicated process, and critical appraisal of the results requires an understanding of how they were obtained. The objectives and rationale of the tasks were described. Some coal studied in some of the tasks were examined. Some problems in duplicating the organic solvents used in the different equipments are described. DOE

N83-27047# Los Alamos Scientific Lab., N. Mex.
THERMOCHEMICAL PROCESSES FOR SOLAR HYDROGEN PRODUCTION
M. G. Bowman 1982 7 p refs Presented at Ann. Meeting of the Intern. Solar Energy, Houston, Tex., 31 May 1982
(Contract W-7405-eng-36)
(DE82-019575; LA-UR-82-1895; CONF-8205112-1) Avail: NTIS HC A02/MF A01

The use of solar energy to produce hydrogen from water is an attractive concept that merits a continuing research and development effort. The base technology being developed for solar thermal power can be applied effectively in the production of hydrogen from water. Hydrogen production could be based on advanced water electrolysis and economic solar hydrogen become an eventual reality even if advanced processes do not prove to be feasible. Thermochemical cycles for decomposing water promise higher efficiencies if cycles can be developed that match the characteristics of solar heat sources. At present, cycles based on sulfuric acid are the most fully developed processes and they can be adapted to solar thermal systems and serve as standards of comparison for new cycles as they are discovered and developed. Advanced cycles based on solids decomposition reactions should interface advantageously with solar thermal systems and several cycles based on such reactions are under experimental evaluation. DOE

N83-27048# Pennsylvania Univ., Philadelphia. School of Medicine.
BIOLOGICAL PRODUCTION OF LIQUID FUELS FROM BIOMASS
E. Kendall Pye and Arthur E. Humphrey [1982] 112 p refs
(Contracts DE-AS02-76ET-20025; EY-76-S-02-4070)
(DE82-008652; DOE/ET-20025/11) Avail: NTIS HC A06/MF A01

A scheme for the production of liquid fuels from renewable resources such as poplar wood and lignocellulosic wastes from a refuse hydropulper was investigated. The particular scheme studied involves the conversion of a cellulosic residue, resulting from a solvent delignified lignocellulosic feed, into either high concentration sugar syrups or into ethyl and/or butyl alcohol. The construction of a pilot apparatus for solvent delignifying 150 g samples of lignocellulosic feeds was completed. Also, an analysis method for characterizing the delignified product was selected and tested. Delignified samples are being prepared and tested for their extent of delignification and susceptibility to enzyme hydrolysis. Work is continuing on characterizing the cellulose and cellobiase enzyme systems derived from the YX strain of Thermomonospora. DOE

N83-27049# National Fertilizer Development Center, Muscle Shoals, Ala.
TVA/DOE INTEGRATED ONFARM ALCOHOL PRODUCTION SYSTEM, PHASE 2 Progress Report, Oct. 1981 - Feb. 1982
Phillip C. Badger, Robert S. Pile, David W. Burch, David A. Mays, and James M. Lewis Mar. 1982 46 p refs
(Contract DE-AI01-80CS-80010)
(DE82-016973; TVA/OACD-82/14) Avail: NTIS HC A03/MF A01

Equipment and procedure necessary for using a grain (corn) feedstock for onfarm alcohol production were refined and documented to provide benchmark data. Also, significant progress was made in developing technology to convert other agricultural crops into 190 proof alcohol with the farm sized alcohol production facility. This was achieved by modifying the base alcohol from grain facility to process the nongrain feedstocks (Irish potatoes, sweet sorghum, sweet potatoes, sugar beets, fodder beets, and Jerusalem artichokes) being evaluated in field production trials by TVA. Alcohol production capacities of cull potatoes, water chestnuts, and cull apples were also tested. A computerized investment model was refined to predict rapidly the economic implications for alcohol production levels, feedstocks, and various system components. DOE

N83-27050# National Fertilizer Development Center, Muscle Shoals, Ala.
OVERVIEW OF FUEL ALCOHOL FROM AGRICULTURAL CROPS WITH EMPHASIS ON THE TENNESSEE VALLEY
Joseph C. Roetheli, Robert S. Pile, and Harold C. Young Feb. 1982 74 p refs
(Contract DE-AI01-80CS-80010)
(DE82-016932; TVA/OACD-82/8; Bull-Y-171) Avail: NTIS HC A04/MF A01

The factors and concerns associated with producing fuel alcohol from agricultural crops were presented. Areas covered include: an assessment of energy used in agriculture; a categorization of grain crop production, land suitable for energy crop production, and livestock production in the 201-county TVA region; a summary of technical and economic information on fuel alcohol production; a discussion of acreages required to produce fuel for benchmark farms in the Tennessee Valley and possible erosion impacts; and a discussion of other pertinent advantages and disadvantages of fuel alcohol production from crops. DOE

N83-27051# Department of Energy, Bartlesville, Okla. Energy Technology Center.
DIESEL FUEL OILS, 1982
Ella Mae Shelton Nov. 1982 36 p refs
(DE83-006115; DOE/BETC/PPS-82/5) Avail: NTIS HC A03/MF A01

Properties of diesel fuels produced during 1982 were submitted for study an compilation under a cooperative agreement between the Department of Energy (DOE), Bartlesville Energy Technology Center (BETC), Bartlesville, Oklahoma and the American Petroleum Institute (API). Tests of 184 samples of diesel fuel oils from 83 refineries throughout the country were made by 27 petroleum groups according to type of diesel fuel. Each group of analyses is subdivided into five tabulations according to five general regions of the country where the fuels are marketed. Data from 13 laboratory tests on each individual diesel fuel sample are listed and arranged by geographic marketing districts in decreasing order of sales volumes. Charts are included showing trends of averages of certain properties for the four types of diesel fuels for the years 1960 to 1982. Summaries of the results of the 1982 survey, compared with similar data for 1981, are shown in Tables 1 through 4 of the report. A summary of 1-D and 2-D fuels are presented in Tabls 5 and 6 respectively. DOE

N83-27052# Los Alamos Scientific Lab., N. Mex.
JET PENETRATION OF INERTS AND EXPLOSIVES
Charles L. Mader, George H. Pimbley, and Allen L. Bowman Nov. 1982 43 p refs
(Contracts W-7405-eng-36; DE-AC06-76RL-01830)
(DE83-003746; LA-9527-MS) Avail: NTIS HC A03/MF A01

The two-dimensional Eulerian hydrodynamic code 2DE, with the shock initiation of heterogeneous explosive burn model called Forest Fire, is used to model numerically the interaction of jets of steel or tantalum with steel, water, and explosive targets. The calculated jet velocity relative to the penetration velocity into inert targets is a function of the square foot of the target density divided by the jet density. The calculated penetration into explosives, initiated by a low-velocity jet, are significantly less than for inerts of the same density. The detonation products near the jet tip have a higher pressure than that of nonreactive explosives, and thus slow the jet penetration. At high jet velocities, the calculated penetration velocities are similar for reactive and inert targets. DOE

N83-27053# Decision Focus, Inc., Palo Alto, Calif.
INTEGRATED FORECASTING MODEL, SYNTHETIC-FUELS STUDY. VOLUME 2: MODEL STRUCTURE AND INPUT DATA
R. A. Marshalla Apr. 1982 257 p refs Sponsored by EPRI
(DE82-905778; EPRI-EA-2358-Vol-2) Avail: NTIS HC A12/MF A01

The future of a synthetic fuels industry in United States, with particular emphasis on the consequences for the electric power industry, is assessed in this study. The assessment is based on use of the Integrated Forecasting Model (IFM), a technology based integrated system model of the national energy economy. The study was performed under the general direction and advice of a working group composed of several representatives from each of six EPRI divisions. This enabled the study to serve as a transfer vehicle for introducing the IFM as a general technology assessment and R & D planning tool. A series of model scenarios was structured around three key uncertainties bearing on the future of synthetic fuels: synfuels process costs, imported oil prices, and system inertia, and aggregate representation of the effects of institutional and other factors on the maximum rate of market penetration of a new technology once it has become economically attractive. The study findings are summarized. DOE

N83-27054# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
DISSOCIATED METHANOL TEST RESULTS
Joseph G. Finegold and J. Thomas McKinnon Apr. 1982 14 p refs Presented at the Automotive Technol. Develop. Contractor Coordination Meeting, Dearborn, Mich., 14 Apr. 1982; Biomass to Methanol Workshop, Durango, Colo., 3-5 Mar. 1982; and Contractor Semiann. Rev. Meeting, Burlingame, Calif., 16-18 May 1982
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-013565; SERI/TP-235-1582; CONF-820445-1; CONF-820324-4; CONF-820541-1) Avail: NTIS HC A02/MF A01

The design and testing of an automotive fuel system that provides hydrogen-rich gases to an internal combustion engine by catalytically cracking, or dissociating, methanol on board the vehicle is described. The vaporization and dissociation of methanol absorb heat from the engine exhaust and increase the lower heating value of the fuel by approximately 22%. In addition, raising the compression ratio and burning with excess air increase the engine thermal efficiency. Engine dynamometer test results with dissociated methanol demonstrated improvement in brake thermal efficiency compared to gasoline from 30% to 100% depending on engine speed and torque. Lower speeds and torques produce the largest improvements. Maps of exhaust temperature and exhaust heat content are presented. The exhaust temperature is almost always high enought for dissociation to occur, but at lower power outputs, there is only enough exhaust energy for partial dissociation of the methanol. DOE

N83-27055# Research Inst. of National Defence, Stockholm (Sweden). Dept. 2.
BORON-CONTAINING FUEL-RICH HTBP PROPELLANTS. MANUFACTURING, BURNING EXPERIMENTS AND SPECIFIC IMPULSE CALCULATIONS
Roland Sanden Jan. 1983 60 p refs In SWEDISH; ENGLISH

summary
(FOA-C-20483-D1) Avail: NTIS HC A04/MF A01

Boron-containing HTPB propellants were manufactured and test fired in a rocket motor. By using HTPB-soluble ferrocene compounds and finely ground ammonium perchlorate, and burning at low pressure, the amount of residues can be reduced to a low proportion. With granulated boron very fast burning propellants can be manufactured. Performance calculations show that the volume specific impulse, even at moderately high boron contents, is considerably higher for boron-containing propellants than for kerosene or for fuel-rich propellants without metal additions.
Author (ESA)

N83-27056# Research Inst. of National Defence, Stockholm (Sweden). Dept. 2.
SENSITIVITY OF ELECTRIC EXPLOSIVE DEVICES TO ELECTROMAGNETIC PULSES: AN ESTIMATION FOR ASSESSING HAZARDS IN CONNECTION WITH STRAY FIELDS FROM AN ELECTROMAGNETIC PULSE STIMULATOR
Ola Listh 28 Feb. 1983 27 p refs In SWEDISH; ENGLISH summary
(FOA-C-20485-D1(D4)) Avail: NTIS HC A03/MF A01

An EMP simulator was erected close to an ammunition store and the risks of premature explosions due to stray fields from the simulator were studied. Results show that common bridgewire electric explosive devices (EED) can withstand 0.5 mJ in pin-to-pin ignition; a 20 dB safety margin should be used, spurious level should not exceed 5 micro J. Conducting composition EEDs cannot withstand the normal electromagnetic environment. For Va type fuseheads a pins-to-case ignition level of 50% occurred at 22 micro J. The varnish around the pyrotechnic mix fusehead is not a protection against pins-to-case ignition. Author (ESA)

N83-27057# Office of Technology Assessment, Washington, D.C.
INCREASED AUTOMOBILE FUEL EFFICIENCY AND SYNTHETIC FUELS: ALTERNATIVES FOR REDUCING OIL IMPORTS. BACKGROUND PAPER NUMBER 2: SELECTED TECHNICAL AND ECONOMIC COMPARISON OF SYNTHETIC OPTIONS
Oct. 1982 257 p refs
(PB83-147363; Background-Paper-2) Avail: NTIS HC A12/MF A01 CSCL 21D

A comparative technical and economic assessment of selected synfuel technologies was studied. It is a component part of a much larger study on energy options. A key purpose of this study is to provide technical and economic comparisons among selected synfuel technologies which, to the extent possible, provides a background and basis which may assist the office of technology assessment (OTA) in its policy deliberations. GRA

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N83-27058* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
METHOD FOR MILLING AND DRILLING GLASS Patent
Stephen H. Rice, inventor (to NASA) Issued 30 Jul. 1980 5 p Filed 30 Jul. 1980 Supersedes N80-29705 (18 - 20, p 2709)
(NASA-Case-GSC-12636-1; US-Patent-4,383,785; US-Patent-Appl-SN-173520; US-Patent-Class-409-131; US-Patent-Class-125-20; US-Patent-Class-408-1R; US-Patent-Class-408-61) Avail: US Patent and Trademark Office CSCL 13H

A process for machining glass by placing a rotating carbide working surface under minimum pressure against an area of glass to be worked is described. Concurrently the region between the working surface and the area of glass is wet with a lubricant consisting essentially of a petroleum carrier, a complex mixture of esters and a complex mixture of naturally occurring aromatic oils.
Official Gazette of the U.S. Patent and Trademark Office

N83-27059# Florida Univ., Gainesville.
CONCRETE CONSTRUCTION USING SLIPFORM TECHNIQUES M.S. Thesis
Bruce R. Carter Nov. 1982 111 p refs
(AD-A124923) Avail: NTIS HC A06/MF A01 CSCL 13/3

This report will examine the use of concrete slipforming techniques to reduce construction costs for particular structures, and discuss the basic equipment and techniques used in the slipforming process. Chapter Two will outline the history of the slipforming technique in America. Chapter Three will discuss the basic equipment and techniques employed in vertical slipforming. Chapter Four will discuss the equipment used in conjunction with horizontal slipforming techniques. Chapter Five will examine the economic and productive aspects involved with slipforming. Chapter Six is a summary of conclusions and recommendations. It is the purpose of this report to acquaint the reader with the advantages and disadvantages of employing slipforming techniques, and to broaden the readers scope of knowledge with respect to the versatility of concrete as a construction material. GRA

N83-27060# Sandia Labs., Albuquerque, N. Mex.
GENERAL MECHANISM ANALYSIS PACKAGE
P. A. Erickson, G. E. Dahms, and M. J. Bailey (Purdue Univ.) 1982 23 p refs Presented at 17th Biennial Mechanisms Conf. on Design Engr., Washington, D.C., 12 Sep. 1982
(Contract DE-AC04-76DP-00789)
(DE82-008158; SAND-82-0618C; CONF-820905-2) Avail: NTIS HC A02/MF A01

The general mechanism analysis package at Sandia National Laboratories is described. This group of computer programs assists the project engineer in the dynamic analysis and design of mechanical devices. A general impact model has been developed to model all higher pair contacts. This enables the program to model virtually all planar mechanisms. Most of the input data to the simulation program is prepred from the existing design data base by a preprocessor (computer) program. The output of the program can be displayed dynamically on a refresh graphics terminal allowing the engineer to view the motion of the mechanism. DOE

N83-27061# Delaware Univ., Newark. Inst. of Energy Conversion.
PHASE-CHANGE MATERIALS IN MASONRY CONSTRUCTION Final Report
Maurice Lang Jan. 1982 136 p refs
(Contract DE-FC02-80CS-30586)
(DE83-007227; DOE/CS/30586-1) Avail: NTIS HC A07/MF A01

A demonstration project leading to commercialization of a passive thermal wall using phase change storage materials (PCM) in masonry construction is reported. Techniques of vacuum forming have been identified and characterized making it possible to produce high-volume low-cost packages for insertion into the core of cement blocks. PCM filled packages with aluminum laminated film produces a long life product capable of operating to store and release solar heat over long periods of time. Accelerated tests indicate operability over the life of the building. Five hundred accelerated test cycles have shown insignificant deterioration of capacity of the phase change material. The testing program shows that the wall is capable of both storing and transmitting heat in a similar manner to conventional trombe walls, but with increased thermal capability. Product cost data on return on investment estimates are low enough to be economically attractive. DOE

N83-27062# West Virginia Univ., Morgantown. Dept. of Mechanical and Aerospace Engineering.
DEPOSITION OF AEROSOLS IN SAMPLING TUBES
J. B. Stenger and R. A. Bajura May 1982 40 p refs
(Contract DE-AM21-79MC-11284)
(DE82-017311; DOE/MC-11284/T14) Avail: NTIS

HC A03/MF A01

The particulate loading in the process stream of coal conversion and gasification plants must be accurately determined for reasons of environmental health and safety and the protection of operating equipment such as gas turbines. A common method of obtaining these measurements is with aspiration probes. Deposition of particulate on the probe walls is a source of significant error in these measurements. Literature on deposition in sampling tubes for laminar and turbulent flows, the effects of the entrance region and bends in the sampling lines are reviewed. A research plan is proposed for additional work in the analysis of deposition. Experimental work is also proposed to verify the analytical studies. Methods to correct for the effects of deposition in sampling lines are developed. DOE

N83-27063# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

FREQUENCY-DOMAIN APPROACH TO PASSIVE BUILDING ENERGY ANALYSIS

Krishnappa Subbarao and John Anderson Jul. 1982 32 p refs (Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)

(DE82-019164; SERI/TR-254-1544) Avail: NTIS HC A03/MF A01

A graphical approach to passive building design is presented. The admittances of each of the building elements to the major driving functions (outdoor temperature and solar radiation) are represented in a two dimensional vector, and the overall dynamic response of the building is obtained by vector addition. The interaction among components is accounted for by a modification of the admittance of the component. Diagrammatic vector addition is emphasized to give an idea of the relative size of the dynamic contribution made by each building component. From the results of this addition and from a simple analysis of the weather, the elevation of the average indoor temperature above the average outdoor temperature, and the amplitude and phase of the diurnal (or any other frequency) fluctuation of the indoor air temperature are obtained. The former is a measure of the actual solar gain reaching the indoor air; the latter describes thermal masses in the building and their coupling to the indoor air and solar radiation. DOE

N83-27064# Tennessee Valley Authority, Chattanooga. Conservation and Energy Management Branch.

FIELD EXPERIENCES UNDERSCORE THE IMPORTANCE OF MOISTURE CONTROL IN ENERGY-EFFICIENT HOMES

Charles W. Jennings and Thomas L. Moody (Middle Tennessee State Univ.) 30 Nov. 1982 31 p refs

(DE83-901234; TVA/OP/ECR-82/98-Rev) Avail: NTIS HC A03/MF A01

The home insulation program (HIP) initiated in August 1977 is discussed. Some weatherized homes are experiencing problems associated with either excessive or insufficient moisture. It is indicated that there are no intrinsic characteristics of the energy efficient house that cause a moisture problem. The need for better control of moisture is emphasized as the infiltration/exfiltration rates are reduced through weatherization. The state-of-the-art for moisture control, relevant case studies, and recommendations for further research and field study regarding the current construction practices and building codes in use are reviewed. DOE

N83-27065# Amana Refrigeration, Inc., Iowa.

ENGINEERING AND MANUFACTURE OF A HIGH-EFFICIENCY, AUTOMATIC DEFROSTING REFRIGERATOR-FREEZER

Raymond H. Bohman and Robert L. Harrison 1982 20 p refs Presented at the ASHRAE Semiannual Meeting, Toronto, 27 Jun. - 1 Jul. 1982 Prepared in cooperation with ORNL

(Contract W-7405-eng-26)

(DE82-017480; CONF-820664-3) Avail: NTIS HC A02/MF A01

The engineering effort and method of manufacture used to build thirty-six high efficiency, automatic defrosting, refrigerator-freezers are described. It was determined that an 18 cubic ft. model would be suited for the market test. Calculations were made to establish its physical size and insulation thicknesses were specified. The heat leaks were calculated using a computer program and the calculation established the expected heat flow when operated in a 90 F ambient with a 5 F freezer and a 38 F fresh food compartment. The program was also used to determine expected performance when various refrigeration system components and configurations were considered. The engineering design and the component selection are discussed. The sequences of prototype testing are followed. DOE

N83-27066# Applied Energy Systems, Inc., Cape Canaveral, Fla.

LOAD LEVELING ON INDUSTRIAL REFRIGERATION SYSTEMS Final Report

H. S. Bierenbaum and A. D. Kraus (Univ. of South Florida) Jan. 1982 189 p refs

(EPRI Proj. 1088)

(DE82-902079; EPRI-EM-2208) Avail: NTIS HC A10/MF A01

A computer model was constructed of a brewery with a 2000 horsepower compressor/refrigeration system. The various conservation and load management options were simulated using the validated model. The savings available for implementing the most promising options were verified by trials in the brewery. Results show that an optimized methodology for implementing load leveling and energy conservation consisted of: (1) adjusting (or tuning) refrigeration systems controller variables to minimize unnecessary compressor starts, (2) the primary refrigeration system operating parameters, compressor suction pressure, and discharge pressure are carefully controlled (modulated) to satisfy product quality constraints (as well as in-process material cooling rates and temperature levels) and simultaneously improve energy efficiency and peak demand, (3) energy cost savings for recovery of heat from the reject side of the refrigeration system are estimated using the newly determined compressor operating conditions as a basis for evaluating the energy cost savings associated with reject heat recovery, and (4) a decision is made to implement the reject heat recovery system based on a cost/benefits analysis. DOE

N83-27067# Rolls-Royce Ltd., Derby (England).

PRODUCTION PLANNING, PRODUCTION SYSTEMS FOR FLEXIBLE AUTOMATION

G. Spur and K. Mertins 1 Sep. 1982 28 p refs Transl. into ENGLISH of Z. fuer Wirt. Fertigung (West Ger.), v. 76, 1981 p 441-448 In ENGLISH and GERMAN

(PNR-90150; Trans-16456/TLT-00908) Avail: NTIS HC A03/MF A01

Trends in flexible manufacturing system (FMS) applications are reviewed. Machining systems contain machines which complement each other and can replace each other. Computer controlled storage systems are widespread, with central storage capacity ranging from 20 pallet spaces to 200 magazine spaces. Handling function is fulfilled by pallet chargers in over 75% of FMS's. Data system degree of automation varies considerably. No trends are noted for transport systems. Author (ESA)

N83-27068# Rolls-Royce Ltd., Derby (England).

PRESENT SITUATION IN DEVELOPMENT OF AUTOMATED MACHINING SYSTEMS IN EUROPE AND AMERICA

Y. Yoshida 1 Sep. 1982 23 p refs Transl. into ENGLISH of Nippon Kikai Gakkai-si (Japan), v. 81, no. 711, Feb. 1978 p 54-59 In ENGLISH and JAPANESE

(PNR-90152; Trans-16415/TLT-00905) Avail: NTIS HC A02/MF A01

The state of the art of machine shop automation in 1976 was reviewed. Systems based on numerical control are described. The survey shows that machining centers account for 75% of machining of parts with a nonrotary shape in automated machining systems. Rotary shape parts are mainly machined by numerical control lathes. Machining lines have from 2 to 10 stations. Transport systems for joining stations are either linear or ring-shaped. Roller conveyor plus pallet is the most popular transport line combination. Author (ESA)

N83-27069# Rolls-Royce Ltd., Derby (England).

THE SERVICING OF COMPLEX NC MANUFACTURING SYS-

TEMS
P. Knauer 16 Aug. 1982 26 p Transl. into ENGLISH of Rept. VDI-440 Friedrichshafen, West Ger., 1982 p 67-77 In ENGLISH and GERMAN
(PNR-90153; Trans-16404/TLT-00904) Avail: NTIS HC A03/MF A01

A servicing-management plan for numerically controlled manufacturing systems is presented. Servicing activities are divided into those with a periodicity < 4 weeks and those with periodicity > 4 weeks. Maintenance and inspection lists, manually compiled from manufacturers' documentation are fed into a computer. Procedures to be completed the following month are produced as printouts annotated with inventory numbers.
Author (ESA)

N83-27070# Rolls-Royce Ltd., Derby (England).
EXAMPLE OF A PLANNED AND IMPLEMENTED FLEXIBLE MANUFACTURING SYSTEM SUITABLE FOR DEVELOPMENT IN STAGES
M. Zick 16 Aug. 1982 28 p Transl. into ENGLISH of Rept. VDI-440 Stuttgart, 1982 p 33-44 In ENGLISH and GERMAN
(PNR-90154; Trans-16403/TLT-00903; VDI-440) Avail: NTIS HC A03/MF A01

The development of a system for machining cubic parts is described. Definition of the overall manufacturing and planning requirement for all the capital equipment to the order stage, taking into account available buildings and further automation is outlined. Planning of the subsequent automation stages to ensure that the technical specifications which were not comprehensively defined at the time the orders were placed could still be submitted and corrected during the delivery time is summarized. Commissioning the production facilities in their basic configuration and consolidation of further automation steps in the data and material flow are treated. Author (ESA)

N83-27071# Rolls-Royce Ltd., Derby (England).
TIME CHARACTERISTIC, CAPACITY AND CONDITIONS FOR THE ADOPTION OF FLEXIBLE PRODUCTION SYSTEMS
Rolf Klaus 8 Jul. 1982 17 p refs Transl. into ENGLISH of Z. fuer Ind. Fertigung (West Ger.), v. 69, 1979 p 97-102
(PNR-90156; Trans-16325/TLT-00896) Avail: NTIS HC A02/MF A01

Assessment criteria for the adoption of flexible production systems are presented. Workpiece-related times, times related to technological positions, and times related to the production system are considered. Flexibility is divided into external (number of different parts which the system can produce economically) and internal (capacity to manufacture a given assortment of parts economically). Short throughput times require high internal flexibility. Operating experience of 55,000 hr reveals that computer-assisted process control is 40% more efficient than manual control.
Author (ESA)

N83-27072# Rolls-Royce Ltd., Derby (England).
SURFACE GRINDING AT HIGH POWER AVOIDING THERMAL EDGE ZONE DAMAGE
H. Schleich 1 Jul. 1982 24 p refs Transl. into ENGLISH of Tech. Mitteilungen (West Ger.), v. 73, no. 11/12, Nov.-Dec. 1980
(PNR-90161; Trans-16300/TLT-00891) Avail: NTIS HC A02/MF A01

Creep feed grinding and conventional surface grinding are compared. Creep feed grinding is faster and has better surface quality and grinding wheel endurance. However, problems are caused by its higher cutting forces, driving powers, and thermal load on workpiece. Open soft grinding wheels have suitable chip formation and coolant supply characteristics for creep feeding. Wheels containing cubic crystalline boron nitride are recommended for creep feed grinding of high speed steel, since they have excellent profile endurance and high volume removal rates with improved surface quality. Author (ESA)

N83-27073# Rolls-Royce Ltd., Derby (England).
CREEP FEED (SINGLE PATH) AND CONVENTIONAL (MULTI-PATH) GRINDING - SURFACE STRUCTURE AND COMPARISON
H. Schleich 1 Jul. 1982 9 p refs Transl. into ENGLISH of Ind. Anzeiger (West Ger.), v. 102, no. 50, 25 Jun. 1980
(PNR-90162; Trans-16299/TLT-00890) Avail: NTIS HC A02/MF A01

The third to fifth order shape variations (roughness) were compared for creep feed and conventional grinding. Case hardening and high speed steel tests are quoted. The continuous, uninterrupted grooves with smooth sides produced by creep feed grinding contrast with the interrupted grooves characterized by ridges and marked plastic deformation in the case of conventional surface grinding. Author (ESA)

N83-27074# Rolls-Royce Ltd., Derby (England).
CREEP-FEED GRINDING: A MODERN VARIANT OF THE PLANE SURFACE GRINDING PROCESS
W. Koenig and H. Laeur-Schmaltz 1 Jul. 1982 10 p Transl. into ENGLISH of article (Aachen)
(PNR-90163; Trans-16298/TLT-00889) Avail: NTIS HC A02/MF A01

Creep feed and conventional grinding are compared. Specifications for an automated combined plane surface - creep feed grinder are presented. It must be possible to preprogram two different grinding cycles with an intervening dressing cycles. The automatic grinder must be equipped with a rigid feed system for the two-stage process, which can provide a steplessly controlled, stick-slip - free workpiece speed over the range 0.01 to 30 m/min. Spindle drive and spindle bearings are to be adapted to the increased demands placed on the machine system by the plungecut grinding technique. An efficient coolant system must be available to provide high pressures and throughput quantities. Author (ESA)

N83-27075# Rolls-Royce Ltd., Derby (England).
TECHNOLOGICAL CHARACTERISTICS OF CREEP-FEED GRINDING. RAISED CUTTING FORCES AND REDUCED WORK PIECE TEMPERATURES, PART 2
P. Werner and E. Minke 1 Jul. 1982 12 p Transl. into ENGLISH of Metallbearbeitung (West Germany), v. 75, no. 5/81, 1981 p 44-48
(PNR-90164-Pt-2; Trans-16296/TLT-00887-Pt-2) Avail: NTIS HC A02/MF A01

Temperature measurement during creep feed and oscillating bed grinding and lubrication during deep cut grinding are discussed. A method of determining heat effects on workpiece surface layers during deep cut grinding is outlined. Results indicate that low surface temperatures occur in creep feed and oscillating bed grinding, but very high temperatures are recorded for the intervening regime. The exit velocity of lubricant from the feed nozzle must equal the grinding wheel circumferential velocity to avoid clogging. Author (ESA)

N83-27076# Rolls-Royce Ltd., Derby (England).
DESIGN REQUIREMENTS FOR CREEP-FEED GRINDERS, PART 3. APPLICATION OF OUTSIDE DIAMETER CREEP-FEED GRINDING, PART 4
1 Jul. 1982 11 p Transl. into ENGLISH of Z. ind. Fertig. (West Germany), v. 69, no. 10, 1979 p 617-620
(PNR-90165-Pt-3/4; Trans-16297/TLT-00888-Pt-3/4) Avail: NTIS HC A02/MF A01

Design requirements for creep feed grinders used in mass production are summarized. They must possess: a high degree of static and dynamic stability; precision guideways, low in friction, nonpositive, with low resilience and good damping; drive outputs in excess of traditional values by a factor of 2 to 5; very precise, rigid spindle bearings, designed for a long life with no maintenance; spindle drives with no lateral thrust or out-of-baiance, fitted with stepless regulation; a uniform table drive, with no stick-slip phenomena, centralized design, covering steplessly the entire speed range from swing to creep feed grinding; separate systems for normal coolant lubrication and high pressure grinding wheel cleaning; and built in systems for dressing and calibration of grinding

wheels. Creep feed grinding of the outside diameter of workpieces with circular arc profile is described. Author (ESA)

N83-27077# Rolls-Royce Ltd., Derby (England).
AUTOMATABLE TOOL SYSTEM FOR TURNING OPERATIONS
Norbert Reiter 1 Jun. 1982 22 p refs Transl. into ENGLISH of TRENN-KOMPENDIUM (West Germany), v. 2, 1981
(PNR-90166; Trans-16283/TLT-00886) Avail: NTIS HC A02/MF A01

A universal lathe tool system and accessories for a complete machining system are described. A coupling for rapid changing of insert holders, insert holder design, tool mounts, and coolant supply system are discussed. Clamping the tool and positioning accuracy, and sizes and load capacity are treated. Tool magazine and tool changing devices, tool setting technology and sensor technology are considered. Author (ESA)

N83-27078# Georgia Inst. of Tech., Atlanta. Environmental Resources Center.
ORGANIC SOLVENT REGENERATION OF GRANULAR ACTIVATED CARBON
Wendall H. Cross, Makram T. Suidan, Michael A. Roller, Byung R. Kim, and Joseph P. Gould Sep. 1982 284 p refs
(PB83-150201; ERC-08-82; OWRT-B-141-GA(1)) Avail: NTIS HC A13/MF A01 CSCL 13B

The use of activated carbon for the treatment of industrial waste-streams was shown to be an effective treatment. The high costs associated with the replacement or thermal regeneration of the carbon have prohibited the economic feasibility of this process. The in situ solvent regeneration of activated carbon by means of organic solvent extraction was suggested as an economically alternative to thermal regeneration. The important aspects of the solvent regeneration process include: the physical and chemical characteristics of the adsorbent, the pore size distribution and energy of adsorption associated with the activated carbon; the degree of solubility of the adsorbate in the organic solvent; the miscibility of the organic solvent in water; and the temperature at which the generation is performed. GRA

N83-27079# Battelle Columbus Labs., Ohio.
DEVELOPMENT OF IMPROVED PLASTIC PIPING MATERIALS AND SYSTEMS FOR FUEL GAS DISTRIBUTION Annual Report, Jan. - Dec. 1981
M. J. Cassady, G. C. Derringer, M. M. Epstein, J. A. Hassell, A. Lustiger, R. L. Markham, W. A. Maxey, S. G. Sampeth, F. S. Uralil, and J. O. Wambaugh Oct. 1982 227 p refs
(PB83-161109; GRI-80/0101) Avail: NTIS HC A11/MF A01 CSCL 13J

Relationships between basic material properties and the long-term mechanical performance of plastic piping used for fuel gas distribution were investigated. Progress is reported in the following areas: the effect of outdoor weathering on the performance of polyolefin pipe; environmental stress crack resistance of polyethylene pipe; evaluation of new commercial polyolefin piping materials; secondary loading effects in polyethylene piping systems, including studies of fracture resistance; rapid crack propagation in polyethylene; fusion mechanics of polyethylene piping materials; structure-property relationships in polyolefins; and long-term sustained pressure testing of plastic piping materials. GRA

N83-27080# Purdue Univ., Lafayette, Ind. Dept. of Civil Engineering.
APPLICATION OF MODERN CONTROL THEORY FOR BUILDING STRUCTURES
M. A. Basharkhah and J. T. P. Yao 1982 76 p refs
(Grant NSF CEE-81-17678)
(PB83-144147; STR-82-89; NSF/CEE-82039) Avail: NTIS HC A05/MF A01 CSCL 13M

The design of feedback compensators is considered for linear and constant-coefficient multivariable systems and an attempt is made to find a suitable gain matrix for active control of structures. The application of the pole-assignment method is discussed. It is based on the shifting of open-loop poles to the left side of the s-plane, and is applicable to mechanical and electrical systems. The second method developed in this study provides a physical understanding of the active control of civil engineering structures because it allows control of several modes of the system. The K matrix of the control law can be found so that the first few modes of the system have smaller displacements than the corresponding displacements of the original system. Therefore, more modes of higher gain can be used to substantially reduce system displacements. Because the pole-assignment method will not always significantly reduce displacements, the second method is found to be better for the control of civil engineering structures. GRA

N83-27081# South Carolina Univ., Columbia. Dept. of Civil Engineering.
MOMENT-ROTATION CHARACTERISTICS OF SEMI-RIGID STEEL BEAM-COLUMN CONNECTIONS Final Report
W. G. Altman, Jr., A. Azizinamini, J. H. Bradburn, and J. B. Radziminski Jun. 1982 157 p refs
(Grant NSF PFR-79-23520)
(PB83-145318; NSF/CEE-82044) Avail: NTIS HC A08/MF A01 CSCL 13M

The potential of semi-rigid beam-to-column connections in contributing to the integrity of steel frame building structures in an earthquake was evaluated. Experimental studies were conducted of bolted connections comprised of top and seat beam flange angles and double web angles to determine moment-rotation behavior under static loading and to measure energy absorption capability under cyclic loading. The cyclic tests consisted of subjecting the beam-column connections to several stages of full reversal, controlled amplitude displacements of progressively increasing magnitude. GRA

N83-27082# Purdue Univ., Lafayette, Ind.
RELIABILITY ASPECTS OF STRUCTURAL CONTROL
M. A. Basharkhah and J. T. P. Yao 1982 64 p refs
(Grant NSF CME-80-18963)
(PB83-145482; NSF/CEE-82056) Avail: NTIS HC A04/MF A01 CSCL 13M

Active control systems can be used to reduce the effect of lateral earthquake ground motion on structures. The basic assumptions and limitations which must be considered when applying an active control system are noted and several nonlinear control systems, including dead-zone, saturation, and a combination of the two, are studied. Through the use of a simulated earthquake, it is shown that the probability of failure may be reduced by using a perfect control system. However, there is always a time lag between the time when a control force is needed and the time when the required control force can be applied. The effect of such delay time on the reliability of structural control is examined. Author (GRA)

N83-27083# Earthquake Engineering Research Inst., Berkeley, Calif.
PREDICTION OF THE SEISMIC RESPONSES OF R/C FRAME-COUPLED WALL STRUCTURES
A. E. Aktan, V. V. Bertero, and M. Piazza Aug. 1982 200 p refs
(Grants NSF CEE-81-07217; NSF PFR-79-08964)
(PB83-149203; UCB/EERC-82/12; NSF/CEE-82061) Avail: NTIS HC A09/MF A01 CSCL 13M

This is the second report summarizing the progress of continuing research on the seismic resistant design of R/C coupled structural walls. The first progress report, UCB/EERC-81/07, contained the background information, objectives, and scope of the complete program. The present report documents the analytical investigations carried out within the integrated analytical and experimental research program, and assesses (1) the state of the art in the analytical seismic response simulation of R/C frame-wall/coupled well structural systems, and (2) the state of the practice (code) in guiding the designer to achieve an optimum seismic design of these systems. Author (GRA)

N83-27084# Earthquake Engineering Research Inst., Berkeley, Calif.

JOINT OPENING NONLINEAR MECHANISM: INTERFACE SMEARED CRACK MODEL
James Shaw-Han Kuo Aug. 1982 93 p refs
(Grant NSF PFR-78-19333)
(PB83-149195; UCB/EERC-82/10; NSF/CEE-82015) Avail: NTIS HC A05/MF A01 CSCL 13B

Contraction joint opening behavior is studied. An economical model called the Interface Smeared Crack Model is developed to simulate the joint opening nonlinear mechanism. The model is based on the general smeared crack approach, with a specially introduced pushing back operation which is intended to correct the local structure response at element level. This method dramatically reduces the computational cost compared with that of a standard joint element analysis. It is demonstrated that it would be beneficial to include joint opening mechanism in the dynamic analysis of arch dams, because joint opening will limit the peak tensile arch stresses and thus improve the seismic resistance of the structure. GRA

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N83-27085* National Aeronautics and Space Administration. Pasadena Office, Calif.
WAVEGUIDE COOLING SYSTEM Patent
Bill C. J. Chen (JPL, California Inst. of Tech., Pasadena) and Robert W. Hartop, inventors (to NASA) (JPL, California Inst. of Tech., Pasadena) Issued 30 Apr. 1981 5 p Filed 30 Apr. 1981 Supersedes N81-29344 (19 - 20, p 2759) Sponsored by NASA
(NASA-Case-NPO-15401-1; US-Patent-4,382,239;
US-Patent-Appl-SN-259210; US-Patent-Class-333-22F;
US-Patent-Class-333-254) Avail: US Patent and Trademark Office CSCL 20N

An improved system is described for cooling high power waveguides by the use of cooling ducts extending along the waveguide, which minimizes hot spots at the flanges where waveguide sections are connected together. The cooling duct extends along substantially the full length of the waveguide section, and each flange at the end of the section has a through hole with an inner end connected to the duct and an opposite end that can be aligned with a flange hole in another waveguide section. Earth flange is formed with a drainage groove in its face, between the through hole and the waveguide conduit to prevent leakage of cooling fluid into the waveguide. The ducts have narrowed sections immediately adjacent to the flanges to provide room for the installation of fasteners closely around the waveguide channel. Official Gazette of the U.S. Patent and Trademark Office

N83-27086*# Harris Corp., Melbourne, Fla. Government Electronic Systems Div.
PHASED ARRAY-FED ANTENNA CONFIGURATION STUDY Final Report
W. F. Crosswell, D. E. Ball, and R. C. Taylor Apr. 1983 163 p refs
(Contract NAS3-23252)
(NASA-CR-168077; NAS 1.26:168077) Avail: NTIS HC A08/MF A01 CSCL 20N

The scope of this contract entails a configuration study for a phased array fed transmit antenna operating in the frequency band of 17.7 to 20.2 GHz. This initial contract provides a basis for understanding the design limitations and advantages of advanced phased array and cluster feeds (both utilizing intergral MMIC modules) illuminating folded reflector optics (both near field and focused types). Design parametric analyses are performed utilizing as constraints the objective secondary performance requirements of the Advanced Communications Technology Satellite (Table 1.0). The output of the study provides design information which serves as a data base for future active phased array fed antenna studies such as detailed designs required to support the development of a ground tested breadboard. In general, this study is significant because it provides the antenna community with an understanding of the basic principles which govern near field phased scanned feed effects on secondary reflector system performance. Although several articles have been written on analysis procedures and results for these systems, the authors of this report have observed phenomenon of near field antenna systems not previously documented. Because the physical justification for the exhibited performance is provided herein, the findings of this study add a new dimension to the available knowledge of the subject matter. Author

N83-27087# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
CONCEPTS FOR A STANDARD DATA INTERCHANGE STRUCTURE (SDIS) INPE PROPOSAL TO CCSDS/PANEL 3
Eduardo Whitaker Bergamini and Ricardo Correa de Oliveira Martins May 1983 26 p refs Presented at the Panel 3 Meeting on Electron. Commun. of the Consultative Comm. on Space Data Systems CCSDS, Lanham, Md., 16-17 May 1983
(INPE-2724-PRE/308) Avail: NTIS HC A03/MF A01

Concepts for a standard data interchange structure (SDIS) are proposed. Applications processes, products and an end-to-end reference physical and system model are identified for characterization of services to be offered with the aid of a SDIS, as a system. Implementation aspects are proposed for the SDIS: logical structure, format and protocol, inspired on the ISO/ANSI Reference Model for open systems interconnection. S.L.

N83-27088# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
CONCEPTS FOR CONNECTIVITY AND INTEROPERABILITY OF WORLD SPACE DATA NETWORKS: INPE PROPOSAL TO CCSDS/PANEL 3
Eduardo Whitaker Bergamini May 1983 24 p refs Presented at the Panel 3 Meeting on Electron. Commun. of the Consultative Comm. on Space Data Systems CCSDS, Lanham, Md., 16-17 May 1983
(INPE-2722-PRE/307) Avail: NTIS HC A02/MF A01

Concepts are presented for an architectural end-to-end reference model based on the identification of classes of applications and products to be offered by services required to exchange data in operational support of space data systems. An Internetwork Transfer Frame (ITF) structure and basic concepts of a protocol are proposed for operational interconnection of data networks. The upward compatibility of these concepts with the higher layers of a standard data interchange structure (SDIS) model is also considered, based on INPE propoasl to CCSDS/PANEL 2. Implementation aspects of the proposed model are also presented with respect to INPE's network. Author

N83-27089# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
DISSEMINATION OF DIGITAL SATELLITE IMAGERY THROUGH TELEPHONE LINES
Paolo P. G. Camilli May 1983 7 p Presented at Image Technol. 1983 - Soc. of Photographic Sci. and Eng. 36th Ann. Conf.
(INPE-2725-PRE/309) Avail: NTIS HC A02/MF A01

This system makes possible the transmission of digital stationary satellite images from master station to several users operating remote units. The operation is based upon the use of RAM memories as buffers to interface the video images with telephone lines. A plan was set up to enable national industry to manufacture and to deliver the remote units to other interested institution. S.L.

N83-27090# Washington Univ., Seattle. Bioelectromagnetic Research Lab.
SUBTLE CONSEQUENCES OF EXPOSURE TO WEAK MICROWAVE FIELDS: ARE THERE NON-THERMAL EFFECTS?
Richard H. Lovely (Battelle Pacific Northwest Lab.), Sheri J. Y. Mizumori (California Univ.), Robert B. Johnson, and Arthur W. Guy

1983 53 p refs
(Contracts N00014-75-C-0464; NIH-N01-ES-62133; Grant NIH-16-P-56818/0)
(AD-A125169) Avail: NTIS HC A04/MF A01 CSCL 06/18

When we speak of subtle consequences of exposure we mean only that the effects were observed in the absence of changes in core temperature due to microwave exposure. When we measure + delta T degree C in core temperature consequent to microwave exposure, we are witnessing a breakdown of thermoregulatory mechanisms. Short of this event, the exposed subject makes a number of thermoregulatory and metabolic accommodations to maintain a constant body temperature and to deal effectively with the energy being deposited in its tissues. These latter changes should interest us for they are the subtle consequences exposure to weak microwave fields. The long-term accommodations, which accompany subchronic exposure, can lead to a number of interesting effects some of which are described below. Two fundamentally different types of experimental protocol were employed. In Experiment 1A, independent groups of male rats were either exposed or sham-exposed to 915 MHz microwaves for 10 hr/night for up to 4 mo. In Experiment 1B, independent groups of rats were similarly exposed, or sham-exposed, to 2450 MHz microwaves for 10 hr/night for 4 mo. In Experiment 2, using a different type of protocol, pregnant female rats were exposed for 20 hr/day for 19 days of gestation. Control groups were either sham-exposed or served as caged controls. The main focus of the study attended to assessment of various functions and the developmental status of the gravid rats' progeny. GRA

N83-27091# Harry Diamond Labs., Adelphi, Md.
EFFECT OF FREQUENCY-DEPENDENT SOIL PARAMETERS ON REFLECTION COEFFICIENTS
Norman V. Hill Dec. 1982 33 p refs
(DA Proj. 1L1-62120-AB-25)
(AD-A124798; HDL-TR-2004) Avail: NTIS HC A03/MF A01 CSCL 20/14

The degree with electromagnetic pulse (EMP) energy is predicted above a reflecting plane is strongly dependent on the nature of the plane. The reflection of electromagnetic energy from a surface can be accurately described mathematically, and equations which predict these fields are common knowledge to the EMP community. Although this is the case, some predictive analysis uses models for the Earth's surface which are independent of frequency and considers only an average soil moisture content. This report describes the varieties of electrical properties with frequency and moisture content. It applies these variations to a reflected EMP and assesses the energy difference between models which use parameters independent of frequency and those which use varying parameters. Finally, it discusses the variation of soil properties with depth and predicts the magnitude of energy, above the ground, which may result from this variation.
Author (GRA)

N83-27092# Army Test and Evaluation Command, Aberdeen Proving Ground, Md.
TEST OPERATIONS PROCEDURES Final Report
2 Feb. 1983 26 p refs
(AD-A124797; TOP-6-2-594) Avail: NTIS HC A03/MF A01 CSCL 20/1

The receiver noise factor (noise figure) is the ratio of input signal-to-noise power ratio at the antenna terminals to the signal-to-noise power ratio at the output terminals of the receiver, when the input termination is at room temperature (290 K). The average noise factor over the frequency range of interest for the particular case of AM and FM surveillance receivers is a measure of the amount of noise power added to a signal by the receiver, thereby degrading signal quality. The noise factor is usually expressed in decibels, it is commonly referred to as the noise figure. Five methods of measurement are given, and the method used will depend upon the test equipment available, the desired accuracy, and the time available to devote to the measurement. Noise figure is usually measured only for the linear parts of the receiver that precede the demodulator. For CW and AM receivers, this includes the RF and IF stages up to the second detector. For FM receiver this includes the RF and IF stages up to the first limiter stage. For receivers with a linear demodulator, such as a product detector, noise figure may be measured for the entire receiver from the antenna input terminals to the audio output terminals. GRA

N83-27093# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
PERFORMANCE OF SEQUENTIALLY DECODED LONG CONSTRAINT LENGTH CODES FOR A SATELLITE COMMUNICATIONS LINK IN A SCINTILLATED CHANNEL M.S. Thesis
James A. Frazier, Jr. Dec. 1982 221 p refs
(AD-A124814; AFIT/GE/EE/82D-32) Avail: NTIS HC A10/MF A01 CSCL 17/2

Convolutional codes with long constraint lengths, on the order of 25 to 30, can be decoded using the Fano sequential decoding algorithm. While some increase in coding gain over short codes may be achieved for small probabilities of bit error, sequential decoding is not optimum and does not perform as well as the Viterbi decoding algorithm. However, because of power limitations on satellite downlinks, the possibility of achieving some additional gain with long constraint length codes for the scintillated signal channel is receiving increasing interest. This report presents an analysis of the performance and implementation trade-offs between short codes with Viterbi decoding and long codes with sequential decoding in an additive white Gaussian noise channel and a scintillation channel created by a high-altitude nuclear detonation. Performance is provided for and EHF, 2400 bps, DBPSK modulated satellite communications link in terms of bit error rates and decoded bit processing delays. GRA

N83-27094# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
TOWARDS VERY LARGE VOCABULARY WORD RECOGNITION
A. Waibel 30 Nov. 1982 37 p refs
(Contract F33615-78-C-1551; Grant NSF MCS-78-25824; ARPA Order 3597)
(AD-A125224; CMU-CS-82-144) Avail: NTIS HC A03/MF A01 CSCL 05/7

In this paper, preliminary considerations and some experimental results are presented in an effort to design Very Large Vocabulary Recognition (VLVR) systems. We will first consider the applicability of current recognition techniques and argue their inadequacy for VLVR. Possible alternate strategies will be explored and their potential usefulness statistically evaluated. Our results indicate that suprasegmental cues such as syllabification, stress patterns, rhythmic patterns, rhythmic patterns and the voiced - unvoiced patterns in the syllables of a word provide powerful mechanisms for search space reduction. Suprasegmental feature could thus operate in a complementary fashion to segmental features. GRA

N83-27095# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A MODEL FOR FORECASTING THE COUNTRY'S GENERAL USE DATA TRANSMISSION NETWORK
Andrzej Kozuchowski, Krystyna Palmowska, and Krystyn Plewko 11 Jan. 1983 22 p refs Transl. into ENGLISH from Prezeglad Telekomun. (Warsaw), v. 52, no. 4, 1979 p 99-103
(AD-A124847; FTD-ID(RS)T-1546-82) Avail: NTIS HC A02/MF A01 CSCL 17/2

The development of the information sciences and the concomitantly growing demand to data transmission services in the telecommunications network makes it necessary to investigate the effects data transmission have on the development of the country's telecommunications network and what the technological and economic consequences of the various forecasts and assumptions concerning, e.g., the number of data transmission subscribers. A method for forecasting development in the data transmission network is developed. The magnitude of the problem, the great number of assumptions requiring testing, as well as the great number of possible variants could be accepted - all of these are

the main factors decisive in the necessity for searching for solutions generated by means of computer programs. In this way, the notion has arisen of a computer-generated system for modeling the data transmission net. GRA

N83-27096# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

COMMUNICATIONS TODAY (SELECTED ARTICLES)

Chengxin Lao and Huizhong Chen 14 Jan. 1983 16 p Transl. into ENGLISH of Xiandai Jongxin (China), no. 8, 1982 p 1-4

(AD-A124795; FTD-ID(RS)T-1750-82) Avail: NTIS HC A02/MF A01 CSCL 17/2

The relationship between communications technology and computer technology is addressed. The measurement of earthquake signals using newly developed computer techniques is also discussed. J.M.S.

N83-27097# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

ENHANCED TRACKING OF AIRBORNE TARGETS USING A CORRELATOR-KALMAN FILTER M.S. Thesis

Paul P. Millner Dec. 1982 371 p refs

(AD-A124884; AFIT/GE/EE/82D-50) Avail: NTIS HC A16/MF A01 CSCL 12/1

Over the past four years considerable work has been accomplished at the Air Force Institute of Technology to improve the tracking capability of the high energy laser weapon against airborne targets. In this research, many of the prior concepts are incorporated into a correlator/Kalman filter to develop a tracker capable of providing precise target position estimates in a dynamic shortrange environment using a Forward Looking Infrared sensor (FLIR) to provide measurement data. Digital signal processing in employed on the FLIR data to identify the underlying target intensity shape function when the target under consideration has either single or multiple hot spots. The estimated target shape function is then used as the template in a correlation algorithm, where spatial and frequency domain correlation techniques were explored, to determine the offsets between the template and the incoming measurement. These offsets are used as pseudomeasurements in a linear Kalman filter which exploits knowledge of the process dynamics and statistical knowledge of the correlator error to enhance the position estimates. Author (GRA)

N83-27098# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

THE PERFORMANCE OF A PN SPREAD SPECTRUM RECEIVER PRECEDED BY AN ADAPTIVE INTERFERENCE SUPPRESSION FILTER

Michael Martin Shepard Dec. 1982 155 p refs

(AD-A124903; AFIT/GE/EE/82-62) Avail: NTIS HC A08/MF A01 CSCL 17/4

The performance of a spread spectrum receiver preceded by an adaptive interference suppression (AIS) filter is determined for various CW jamming signals. An analysis and simulation of an AIS filter, covering the band from 200-300 MHz, implemented with a SAW device is presented. The simulation includes modeling of the SAW device, filter tap weights, Applebaum and power inversion adaptive control algorithms, and filter fabrication and circuitry errors. Both desired and interfering signals are generated in the simulator, passed through the AIS filter, and demodulated by a simulated matched filter. System performance was determined by measuring the improvement in pre-detection signal-to-jammer ratio (SJR) and post-detection signal-to-jammer plus noise ratio (SJNR) provided by the filter, and by computing the AIS filter convergence rate. To validate the AIS filter performance, the following additional simulation data was acquired both before and after filter adaption: the filter frequency response, the receiver corrrelation response, and the pre-detection signal plus jammer plus noise spectrum. GRA

N83-27099# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

RESTORATION OF PULSE POSITION MODULATED SIGNAL IN A HIGH NOISE ENVIRONMENT M.S. Thesis

Kenneth N. Frankovich Dec. 1982 269 p refs

(AD-A124902; AFIT/GE/EE/82D-31) Avail: NTIS HC A12/MF A01 CSCL 17/2

The performance of a pulse position modulation (PPM) receiver, operating at a predetection signal-to-noise ratio below threshold, is severely degraded by the occurrence of anamolous pulsas. The anamolies are caused by noise with sufficient amplitude to be detected as a signal pulse. The resultant multiple threshold crossings per sample frame severely degrade the demodulated version of the original message. In this report, a maximum a posteriori (MAP) amplitude sequence estimator is developed based on the Viterbi algorithm. The signal is modelled as a finite-state, discrete-time Markov process. The states correspond to the possible positions within a quantized version of the sample frame receiver structure and associated operating characteristics are presented in support of the concept of a quantized PPM frame. The pulse position/amplitude sequence is observed in white Gaussian noise, and probability of detection for each signal pulse is assumed equal to one. Monte Carlo simulation is used to determine the average performance of the estimator. GRA

N83-27100# Naval Research Lab., Washington, D. C.

IONOSPHERIC IRREGULARITIES AND THEIR POTENTIAL IMPACT ON SYNTHETIC APERTURE RADARS

E. P. Szuszcewicz, M. Singh, P. Rodriguez, and S. Mango 23 Feb. 1983 27 p refs

(XF12141350; RR0330244)

(AD-A124942; NRL-MR-4999) Avail: NTIS HC A03/MF A01 CSCL 17/9

Accumulating data are making it increasingly evident that major plasma irregularities populate substantial portions of the ionosphere. In contrast with these findings, satellite-borne synthetic aperture radar (SAR) systems tacitly assume that the ionosphere is uniformly layered and unchanging under the orbiting SAR. Analysis of plasma irregularity structures measured directly on the S3-4 satellite shows that this assumption is readily violated near the nighttime equator during the occurrence of spread-F and at all high-latitudes on a nearly 24 hour basis. The irregularities can be very intense, covering scale sizes from meters to hundreds of kilometers. Associated along-track phase path calculations point to a potentially serious problem in SAR imaging integrity in restricted ionospheric space-time domain. Author (GRA)

N83-27101# Naval Research Lab., Washington, D. C.

A NEW TECHNIQUE FOR REDUCING RADAR RESPONSE TO SIGNALS ENTERING ANTENNA SIDELOBES Interim Report

9 Feb. 1983 13 p refs

(XF12141004)

(AD-A125191; NRL-8669) Avail: NTIS HC A02/MF A01 CSCL 17/9

A new technique for reducing a radar's response to undesired signals entering a radar's sidelobes is described and analyzed theoretically. This technique involves moving the phase center of a phased-array antenna to Doppler-shift sidelobe signals out of the radar receiver's passband. Author (GRA)

N83-27102# Southeastern Center for Electrical Engineering Education, Inc., St. Cloud, Fla.

BASIC EMC TECHNOLOGY ADVANCEMENT FOR C3 SYSTEMS. VOLUME 4A: COUPLING OF ELECTROMAGNETIC FIELDS ONTO TRANSMISSION LINES. A COMPARISON OF THE TRANSMISSION OF LINE MODEL AND THE METHOD OF MOMENTS Phase Report, Jun. - Dec. 1981

Robert T. Abraham and Clayton R. Paul Griffiss AFB, N.Y. RADC Nov. 1982 175 p refs

(Contract F30602-81-C-0062; AF Proj. 2338)

(AD-A124861; RADC-TR-82-286-Vol-4A) Avail: NTIS HC A08/MF A01 CSCL 17/2

The coupling of electromagnetic fields onto transmission lines is investigated. The transmission line model which with distributed sources is employed as a computationally efficient method of predicting currents induced on transmission wires by an incident

field. Results obtained from the transmission line model solution are compared with predictions made by the more rigorous, but much less efficient, method of moments technique. Two user-oriented computer codes, using different expansion and testing functions, have been selected to provide the method of moments solution. Both the prediction accuracy and limitations of the transmission line model are explored in depth using a carefully selected transmission line structure. The structure is modified slightly to illustrate several important characteristics of the transmission line model solution. Low frequency limitations of the method of moments solution are investigated. In addition, the differences between the two method of moments formulations are found to have a significant effect on the integrity of their individual solutions. These differences are illustrated. Finally, the practical use of the transmission line model as an effective method for predicting the coupling of an electromagnetic field into terminal devices is discussed. GRA

N83-27103# Sierra Geophysics, Inc., Redmond, Wash.
THREE-DIMENSIONAL WAVE PROPAGATION USING BOUNDARY INTEGRAL EQUATION TECHNIQUES Final Technical Report, Oct. 1980 - Sep. 1982
Randy J. Apsel, R. Kipper Wyss, George R. Mellman, and Robert S. Hart Jan. 1983 77 p refs
(Contract N00014-81-C-0148; ARPA Order 4042)
(AD-A124956; SGI-R-83-083) Avail: NTIS HC A05/MF A01 CSCL 20/14

The Boundary Integral Equation (BIE) approach for simulating wave propagation in three-dimensional, irregular multilayered, viscoelastic media is formulated. The BIE formulation takes advantage of known wave propagation properties within an individual layer, leaving only the interactions at the layer boundaries to be treated numerically. This essentially reduces the problem by one spatial dimension and represents a concise treatment of the pertinent physics involved. The resulting system of singular boundary integral equations is much smaller than the corresponding system of equations using the Finite Difference or Finite Element approach, but the block diagonal matrices are much more dense. Two methods are presented for dealing with these dense matrix equations. First an approximate Kirchhoff technique is derived in which only local values of the wave field are allowed to interact with the layer boundaries and the propagation through multilayered structures is accomplished by cascading up and down through the stack to get higher order reflections. Since the Kirchhoff approximation is not valid for critical reflections and some diffraction effects, a second and more complete BIE solution technique was developed which iteratively deals with the singular matrix equation from a perturbation point of view with respect to known flat layer solutions. While the Kirchoff algorithm is a fully three dimensional code for any number of layers, the current iterative BIE algorithm solves a more specialized class of problems and planned extensions to the general case are outlined. GRA

N83-27104# California Univ., Berkeley. Lawrence Berkeley Lab. Lightning Systems Research.
PROCEEDINGS OF THE LIGHTNING-ELECTROMAGNETIC COMPATIBILITY CONFERENCE
Rudolph R. Verderber, ed. and Samuel M. Berman, ed. Sep. 1982 112 p refs Conf. held in Berkeley, Calif., 18-19 Mar. 1982
(Contract DE-AC03-76SF-00098)
(DE83-005707; LBL-15199) Avail: NTIS HC A06/MF A01

The biological effects of radio frequency radiation, AM radio interference reduction through control of a radiated electric field, electrical system waveform distortion, conducted and radiated signature of fluorescent lamp systems in C and I environments, and EMI measurements of lighting systems are discussed. For individual titles, see N83-27105 through N83-27109.

N83-27105# Veterans Administration Hospital, Loma Linda, Calif. Neurobiology Lab.
BIOLOGICAL EFFECTS OF RADIO-FREQUENCY RADIATION
Asher R. Sheppard *In* LBL Proc. of the Lightning-Electromagnetic Compatibility Conf. Sep. 1982 p 9-23 refs (For primary document see N83-27104 16-32)
Avail: NTIS HC A06/MF A01

The electromagnetic radiation from proposed new lighting systems falls into a portion of the spectrum of non-ionizing radiations (NIRs) that has been little explored. NIR bioeffects research has moved from an initial interest only in the heat effects to a considerations of nonthermal interactions, particularly those related to modulated or pulsed RF waves. Worldwide standards for NIR in the range of 10 MHz to 300 GHz are reviewed along with the underlying biophysical principles. Philosophies of standards setting are discussed. The bioeffects literature is briefly reviewed in order to indicate some current research trends. It is suggested that the weak fields associated with EMI from lighting sources would be a biological concern only if nonthermal interactions at very low levels prove important. DOE

N83-27106# General Electric Co., Schenectady, N. Y. Electrical Systems and Technology Lab.
REDUCTION OF AM RADIO INTERFERENCE THROUGH CONTROL OF RADIATED ELECTRIC FIELD
Victor D. Roberts *In* LBL Proc. of the Lightning-Electromagnetic Compatibility Conf. Sep. 1982 p 24-34 (For primary document see N83-27104 16-32)
Avail: NTIS HC A06/MF A01

The control of electromagnetic interference is becoming an increasing important aspect of electronic product design. For residential applications, interference with AM radios is of particular concern. Interference control activities in the AM band have traditionally centered on magnetic (H) field radiation since the FCC does not limit the E field radiation below 18 MHz, and it has been assumed that AM radios using ferrite rod antennas are H field receivers. During this study, it was determined that the E field sensitivity of some AM radios is approximately equal to their H field sensitivity. It was also determined that one particular electronically ballasted lamp design could be made interference free by controlling both E and H field radiation. An effective E field shield is described which does not require connection to the power supply ground. DOE

N83-27107# Naval Ship Research and Development Center, Annapolis, Md. Electrical Systems Div.
ELECTRICAL SYSTEM WAVEFORM DISTORTION
J. P. Goodman *In* LBL Proc. of the Lightning-Electromagnetic Compatibility Conf. Sep. 1982 p 35-52 (For primary document see N83-27104 16-32)
Avail: NTIS HC A06/MF A01

Interaction phenomena between electric power sources and system loads can result in poor power quality for sensitive electronic equipment. The paper discusses load linearity, power system source impedance, typical problem loads and approaches to restoring electric power quality. Although the discussion is primarily on naval shipboard power systems the theory also is applicable to commercial power systems and equipment. DOE

N83-27108# General Electric Co., Cleveland, Ohio. Fluorescent Systems Dept.
CONDUCTED AND RADIATED SIGNATURES OF FLUORESCENT LAMP SYSTEMS IN C AND I ENVIRONMENTS
Sina Javidi *In* LBL Proc. of the Lightning-Electromagnetic Compatibility Conf. Sep. 1982 p 53-73 (For primary document see N83-27104 16-32)
Avail: NTIS HC A06/MF A01

The power line conducted EMI and radiated EMI generated by four samples of electronic fluorescent ballasts, and four samples of electromagnetic ballasts are presented. Conducted and radiated test protocols are given for these experiments. Proposed FCC limits under Part 18 of Rules and Regulations are compared to the EMI levels of the test samples. Author

N83-27109# California Univ., Berkeley. Lawrence Berkeley Lab. Lightning Systems Branch.
EMI MEASUREMENTS OF LIGHTNING SYSTEMS
Allan Arthur, Leon Leung, and Rudolph R. Verderber *In its* Proc.

of the Lightning-Electromagnetic Compatibility Conf. Sep. 1982 p 74-95 refs (For primary document see N83-27104 16-32)
Avail: NTIS HC A06/MF A01

Electromagnetic interference (EMI) measurements were made on several types of gas discharge lamps operated at 60 Hz and at high frequency. Electric and magnetic field data were collected to determine the near field impedance (1 to 4 kHz). The radiated E field at one meter from the lamps was 1 to 10 volts per meter. H fields were measured at 1 milliamp per meter. On-site EMI measurements from an installation of 140 solid state ballasts operating lamps at high frequency show radiated and conducted levels that are about the same magnitude as those produced by a single solid state ballasted system. DOE

N83-27110# Sandia Labs., Albuquerque, N. Mex.
DESIGN AND SIMULATION OF A UNIQUE SIGNAL MECHANISM
P. A. Erickson, G. M. Ferguson, and E. W. Kenderdine 1982 15 p Presented at the 17th Biennial Mechanisms Conf. on Design Eng., Washington, D.C., 12 Sep. 1982
(Contract DE-AC04-76DP-00789)
(DE82-011568; SAND-82-0617C; CONF-820905-1) Avail: NTIS HC A02/MF A01

The design and operation of an unique signal mechanism is described. The mechanism remains locked until a unique signal sequence is inserted and then the mechanism moves to an enable position. An erroneous pattern causes the mechanism to lock requiring manual reset. The dynamic performance of the mechanism is evaluated using Sandia's Mechanism Simulation and Analysis Program. The simulation results are compared to experimental data. DOE

N83-27111# Research Inst. of National Defence, Linkoeping (Sweden). Dept. of Applied Electronics.
SIMULATION OF MULTIPATH PROPAGATION ON DIGITAL RADIOLINKS
Stefan Mattsson Oct. 1982 162 p refs In SWEDISH; ENGLISH summary
(FOA-A-30032-E2) Avail: NTIS HC A08/MF A01

A fade simulator capable of simulating multipath propagation within the microwave range was built to study system limitations of digital radiolinks (40 to 80 km), and for measuring the resistance to frequency-selective fading. The radiolink consisted of two 4-phase modulation systems, data bit-rate 34 Mbit/sec at 2.1 GHz, 7.2 GHz. The influence of the fading signal on the received power level, and quantification of the resistance to frequency selective fading are discussed. Countermeasures which reduce sensitivity to frequency-selective fading, e.g., using a simple adaptive equalizer were studied. Author (ESA)

N83-27112# Kiruna Geophysical Inst. (Sweden).
RAY TRACING IN DISSIPATIVE MEDIA
Kjell Roennmark (Umeaa Univ., Sweden) Jan. 1983 11 p refs Submitted for publication
(KGI-Preprint-060; ISSN-0349-2656) Avail: NTIS HC A02/MF A01

Equations describing the motion of a wave packet in an anisotropic, weakly inhomogeneous, dissipative medium are derived within the framework of geometric optics, without introducing complex space coordinates. The dispersion function of upper hybrid waves in a two temperature electron plasma was evaluated numerically, using the computer program WHAMP. The results show that dissipation can have a strong influence on the group velocities of weakly damped waves. Author (ESA)

N83-27113# Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. Systemes et Communications.
DECODING AND SYNCHRONIZATION OF ERROR CORRECTING CODES Ph.D. Thesis [SUR LE DECODAGE ET LA SYNCHRONIZATION DES CODES CORRECTEURS D'ERREURS]
Said Aly Madkour 31 Jan. 1983 137 p refs In FRENCH
(ENST-E-83001) Avail: NTIS HC A07/MF A01

Decoding devices for hard quantization and soft decision error correcting codes are discussed. A Meggit decoder for Reed-Solomon polynominal codes was implemented and tested. It uses 49 TTL logic IC. A maximum binary frequency of 30 Mbit/sec is demonstrated. A soft decision decoding approach was applied to hard decision decoding, using the principles of threshold decoding. Simulation results indicate that the proposed schema achieves satisfactory performance using only a small number of parity checks. The combined correction of substitution and synchronization errors is analyzed. The algorithm presented shows the capability of convolutional codes to correct synchronization errors as well as independent additive errors without any additional redundancy. Author (ESA)

N83-27114# Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. Systemes et Communications.
NUMERICAL TREATMENT OF DOPPLER RADAR SIGNALS Ph.D. Thesis [TRAITEMENT VIDEO DOPPLER EN RADAR]
Buran Gonullu 17 Dec. 1982 200 p refs In FRENCH
(ENST-E-82014) Avail: NTIS HC A09/MF A01

Doppler radar signal processing algorithms are discussed. The analysis of a moving target identification filter system leads to a fast Fourier transform implementation with a matrix of order eight. The analytic computation of the plot center, the estimation of radial velocity, the logarithmic laws and the multiplication using a PROM table are discussed. Applications of filters with distributed zeroes and of residium arithmetic are examined. Author (ESA)

N83-27115# Fondazione Ugo Bordoni, Rome (Italy).
ANALYSIS OF REPRESENTATIVE PARAMETERS GROUPING FOR THE EVALUATION OF VOICE SIGNAL AUTOMATIC SPEAKER RECOGNITION METHODS [SISTEMA DI ANALISI DEGLI AGGRUPPAMENTI DI PARAMETRI RAPPRESENTATIVI DEL SIGNALE DI VOCE PER LA VALUTAZIONE DI METODI PER IL RICONOSCIMENTO AUTOMATICO]
Foster Bianchi, Paolo Pocci, and Lucio Prina-Ricotti Jun. 1982 9 p refs In ITALIAN
(FUB-14-1982) Avail: NTIS HC A02/MF A01

For any given set of coefficients representing a voice signal in a parametric space a speaker recognition method evaluation is proposed, based on the analysis of the element grouping derived from a sequential chart in which each element is characterized by its distance to the next element. In this chart groups are identified by low distance values. An iterative procedure is used to identify the central elements of each group. The experimental procedure used to test the grouping analysis is described. Author (ESA)

N83-27116# Fondazione Ugo Bordoni, Rome (Italy).
SPECTRAL ANALYSIS WITH AN EXPONENTIAL WINDOW ITERATIVE METHOD: THE PERFORMANCE OF THE SIGNAL FREQUENCY EVALUATION [ANALISI SPETTRALE CON UN METODO ITERATIVO A FINESTRE ESPONENZALI: PRESTAZIONI NELL'INSEGUIMENTO DI FREQUENZE]
Foster Bianchi, Paolo Pocci, and Lucio Prina-Ricotti Aug. 1982 15 p refs In ITALIAN
(FUB-15-1982) Avail: NTIS HC A02/MF A01

The analysis of the transients of the voice signal by signal sampling with filter parameters readjusted at short intervals is discussed. An iterative method is used to compute the correlation coefficients after each sampling interval, simulating the computing of the autocorrelation in a digital filter with the voice signal as input, which allows a linear predictive coding analysis with good resolution and small computing times to be performed. A procedure to verify the rapidity and precision of the frequency estimation, using ramp modulated variable frequency test signals was adopted. The convergence of the coefficients of the iterative correlation is confirmed. The capacity of the algorithm to follow fast spectral variations is shown. Author (ESA)

N83-27117# Fondazione Ugo Bordoni, Rome (Italy).
FREQUENCY CHARTS USING AN ITERATIVE SIGNAL PROCES-

SING METHOD [TRACCIAMENTO DI FREQUENZE CON UN METODO DI ELABORAZIONE ITERATIVA DEL SEGNALE]
Foster Bianchi, Paolo Pocci, and Lucio Prina-Ricotti Jul. 1982 20 p refs In ITALIAN
(FUB-16-1982) Avail: NTIS HC A02/MF A01

The analysis of the transients of the voice signal by signal sampling with filter parameters readjusted at short intervals is discussed. For the computation of the correlation coefficients an iterative method is used which gives outlet values at each sampling interval, allowing for a linear predictive signal analysis with good resolution and computing time. The rapidity and precision of the frequency estimation was tested by modulated frequency test signals with either step, ramp, or sinus modulation. The results show the influence of the characteristics of the time interval on the algorithm capacity to follow fast spectral variations.
Author (ESA)

N83-27118# Fondazione Ugo Bordoni, Rome (Italy).
DPSNA-1: A SIMULATION MODEL FOR QUEUEING NETWORKS WITH LIMITED CAPACITY AND REPETITION OF SERVICE DEMAND CALLS [DPSNA-1: UN MODELLO SIMULATIVO PER L'ANALISI DI RETI DI CODE CON CAPACITA LIMITATA E RIPETIZIONE DELLE RICHIESTE DI SERVIZIO]
Luigi Curzi, Davide Grillo, and Germano Tartaruga Sep. 1982 27 p refs In ITALIAN
(FUB-19-1982; FUB-3B3182) Avail: NTIS HC A03/MF A01

A simulation program in which nodes are represented as having a limited queueing capacity, while channels between nodes are assumed to be unlimited is described. The data flow is controlled by differentiating the queue access in function of the call origin. External packets are admitted in the network only if the node occupation level is less than a given fraction. Incoming messages from other nodes are admitted without restrictions and in the case of saturation are repeated. The program structure, inlet data, outlet statistics and a set of term definitions are detailed. Author (ESA)

N83-27119# Fondazione Ugo Bordoni, Rome (Italy).
AUTOMATIC GENERATION OF ADEQUATE GRAPHS WITH GIVEN CONNECTIVITY CONDITIONS [GENERAZIONE AUTOMATICA DI GRAFI SODDISFACENTI PREFISSATI VINCOLI DI CONNETTIVITA]
Piero Filipponi and Ugo Mocci Oct. 1982 18 p In ITALIAN
(FUB-20-1982) Avail: NTIS HC A02/MF A01

A computerized procedure to generate graphs describing a communications network is presented. An initial network description for given connectivity conditions, either to formulate more precise connectivity conditions or to initiate optimization procedures is sought. Conditions related to the minimum rank of network nodes and the minimum number of links between nodes are considered. Both conditions are treated as a function of the Euclidean distance between nodes and the data flow requirements between each pair of nodes. An oriented, symmetrical graph is generated such that with a limited number of links both conditions can be satisfied. Experiments (using FORTRAN) show that the procedure can produce connected graphs with a small number of links. Author (ESA)

N83-27120# Fondazione Ugo Bordoni, Rome (Italy).
THE STATISTICAL PROPERTIES OF AUTOSYNCHRONIZING SCRAMBLERS [PROPRIETA STATISCHE DEGLI SCRAMBLER AUTOSINCRONIZZANTI]
Odoardo Brugia, Giovanni Campanini, and William Wolfowicz Apr. 1982 27 p refs In ITALIAN
(FUB-21-1982) Avail: NTIS HC A03/MF A01

The state probabilities of three types of autosynchronizing scramblers are determined, including scramblers with guard rings at single or double counting bias level. Expressions for the binary symbols probability and for the output zeroes sequence probability are given. It is shown that the guard ring interventions do not affect the uniformity of probability distributions for any set of inlet binary symbols. Author (ESA)

N83-27121# Fondazione Ugo Bordoni, Rome (Italy).
DESIGN OF AN ADDITIVE SCRAMBLER FOR PARALLEL CONNECTION WITH NUMERICAL MULTIPLEXERS AT 565 Mb/SEC [PROGETTO DI UNO SCRAMBLER ADDITIVO DESTINATO A ESSERE INSERITO IN PARALLELO NEI MULTIPLATORI NUMERICI A 565 Mb/S]
Odoardo Brugia, Maurizio Pioli, and William Wolfowicz (Face Standard) Jul. 1982 14 p refs In ITALIAN
(FUB-22-1982) Avail: NTIS HC A02/MF A01

The implementation of an additive, or reset, scrambler is described. The functional equivalence of such a circuit to a series scrambler used for statistics conversion in high capacity radio links or coaxial cable data transmission numerical multiplexing is demonstrated. The schemes for parallel or series connection of additive scramblers to numerical multiplexers are compared. The basis of the synthesis methods are developed. Author (ESA)

N83-27122# Fondazione Ugo Bordoni, Rome (Italy).
STATISTICAL PROPERTIES OF THE SEQUENCES PRODUCED BY ADDITIVE SCRAMBLERS [PROPRIETA STATISTICHE DELLE SEQUENZE EMESSE DA SCRAMBLER DI TIPO ADDITIVO]
Odoardo Brugia, Giovanni Campanini, and William Wolfowicz Jul. 1982 20 p refs In ITALIAN
(FUB-23-1982) Avail: NTIS HC A02/MF A01

The dependance of the outlet binary symbols probability on the inlet symbols probability is evaluated and the outlet zeroes sequence statistics are analyzed. The scrambler is used in parallel in a numerical multiplexer at 4 x 140 Mbit/sec. The scheme of a generic additive scrambler is described. It is concluded that for a given number of unitary delay elements the zeroes sequence probability of the parallel additive scrambler is uniformly lower than the corresponding probability of an autosynchronizing scrambler with guard ring. Author (ESA)

N83-27123# Fondazione Ugo Bordoni, Rome (Italy).
SPEECH INTELLIGIBILITY IN CLOSED LARGE SCALE ENVIRONMENTS [INTELLIGIBILITIA DELLA PAROLA NEGLI AMBIENTI CHIUSI DI GRANDI DIMENSIONI]
Foster Bianchi Oct. 1982 15 p In ITALIAN
(FUB-24-1982) Avail: NTIS HC A02/MF A01

The recognition capacity of useful sound signal data, of information about the source, and of the space location of the source is analyzed in relation to signal and environment characteristics, including the average phoneme duration, the reverberation time constant, the signal to noise ratios and the ratio between direct and reflected energy. The characteristics of subjective test methods required for intelligibility evaluation are described. It is suggested that the larger cost of the time test is compensated by the quantity and the quality of the resultant data, and by the possibility of deriving statistical correlations of the speech intelligibility with the various parameters on which it depends.
Author (ESA)

N83-27124# Fondazione Ugo Bordoni, Rome (Italy).
TEST NETWORKS DEFINED BY AN AVERAGE RANK AND A PLANARITY INDEX [RETI DI PROVA CON VINCOLI SUL GRADO MEDIO E SULL INDICE DI PLANARITA]
Odoardo Brugia and Piero Filipponi Dec. 1982 19 p refs In ITALIAN
(FUB-31-1982) Avail: NTIS HC A02/MF A01

A network model, easy to computerize, and representative of middle distance communication networks is presented. The model is based on the definitions of the average rank and the planarity index, which are parameters describing basic graph properties such as the minimum number of links to be removed to remain a planar graph. A class of networks is defined by a set of inequalities quantizing these parameters. The computerized random generation of such a class of networks is described. Author (ESA)

N83-27125# Fondazione Ugo Bordoni, Rome (Italy).
A FLOW CONTROL SCHEME CONSIDERING RETRANSMISSIONS IN PACKET SWITCHED DATAGRAM TRANSPORT

NETWORKS
Davide Grillo Oct. 1982 17 p refs Presented at 30th Congr. Intern. delle Comun., Genoa 12-15 Oct. 1982
(FUB-32-1982; FUB-3C3082) Avail: NTIS HC A02/MF A01

A flow control scheme based on differential access to memory resources in the network switches, depending on whether packets are offered from outside the network or have already been processed in the entry switch, was investigated. The protocol related to the transport network ensures that a packet accepted in the subnetwork is made available at the exit switch, retransmitting from the entry switch packets initially accepted and subsequently dropped due to shortage of buffer space in the exit switch until successfully forwarded to destination. The results show that retransmissions negatively impact on network preformance unless packets advanced beyond the entry switch are given exclusive, dynamic access to a portion of the buffer memory. The protocol guaranteeing delivery of accepted packets and featuring retransmission while favoring internal against external and retransmitted packets, performs similarly to the protocol in which packets dropped inside the transport network are resubmitted for delivery without exception from outside that subnetwork. Author (ESA)

N83-26809# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
THE BOJARSKI-LEWIS IDENTIFY FOR ELASTIC WAVE SCATTERING Final Report
D. A. Lee *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 586-597 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 20/14

N83-27766# California Univ., Berkeley. Lawrence Berkeley Lab.
LOOP COUPLING TO A RADIO FREQUENCY QUADRUPOLE RESONATOR (RFQ)
D. Howard and H. Lancaster *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 194-196 refs (For primary document see N83-27724 16-70)
(Contract W-7405-eng-48)
Avail: NTIS HC A17/MF A01

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

N83-27126* National Aeronautics and Space Administration. Pasadena Office, Calif.
ELECTRONIC SYSTEM FOR HIGH POWER LOAD CONTROL Patent
Emmett L. Miller, inventor (to NASA) (California Inst. of Tech., Pasadena) Issued 24 Dec. 1980 8 p Filed 24 Dec. 1980 Supersedes N83-17805 (21 - 08, p 1176) Sponsored by NASA (NASA-Case-NPO-15358-1; US-Patent-4,382,224; US-Patent-Appl-SN-219968; US-Patent-Class-323-269; US-Patent-Class-323-303; US-Patent-Class-323-350) Avail: US Patent and Trademark Office CSCL 09C

Parallel current paths are divided into two groups, with control devices in the current paths of one group each having a current limiting resistor, and the control devices in the other group each having no limiting resistor, so that when the control devices of the second group are turned fully on, a short circuit is achieved by the arrangement of parallel current paths. Separate but coordinated control signals are provided to turn on the control devices of the first group and increase their conduction toward saturation as a function of control input, and when fully on, or shortly before, to turn on the control devices of the second group and increase their conduction toward saturation as a function of the control input as that input continues to increase. Electronic means may be used to generate signals. The system may be used for 1-V characteristic measurements of solar arrays as well as for other load control purposes.
Official Gazette of the U.S. Patent and Trademark Office

N83-27127*# Maxwell Labs., Inc., San Diego, Calif.
HIGH FREQUENCY, HIGH POWER CAPACITOR DEVELOPMENT Final Report
C. Wayne White and Paul S. Hoffman 10 Mar. 1983 89 p
(Contract NAS3-22668)
(NASA-CR-168035; NAS 1.26:168035; MLR-1430) Avail: NTIS HC A05/MF A01 CSCL 09A

A program to develop a special high energy density, high power transfer capacitor to operate at frequency of 40 kHz, 600 V rms at 125 A rms plus 600 V dc bias for space operation. The program included material evaluation and selection, a capacitor design was prepared, a thermal analysis performed on the design. Fifty capacitors were manufactured for testing at 10 kHz and 40 kHz for 50 hours at Industrial Electric Heating Co. of Columbus, Ohio. The vacuum endurance test used on environmental chamber and temperature plate furnished by Maxwell. The capacitors were energized with a special power conditioning apparatus developed by Industrial Electric Heating Co. Temperature conditions of the capacitors were monitored by IEHCo test equipment. Successful completion of the vacuum endurance test series confirmed achievement of the main goal of producing a capacitor or reliable operation at high frequency in an environment normally not hospitable to electrical and electronic components. The capacitor developed compared to a typical commercial capacitor at the 40 kHz level represents a decrease in size and weight by a factor of seven. Author

N83-27128# Air Force Systems Command, Wright-Patterson AFB, Ohio.
CHANGES IN THE STATES OF AGGREGATION ON THE ELECTRODES DURING CONDENSED DISCHARGES
Vladimir Hermoch, Bohumil Zitka, and Karel Sobra 14 Jan. 1983 24 p refs Transl. into ENGLISH from Czech. Fiz. Zh. (USSR), v. 4, no. 4, 1954 p 486-495
(AD-A124780; FTD-ID(RS)T-1851-82) Avail: NTIS HC A02/MF A01 CSCL 09/9

Properties of condensed discharges were examined from the point of view of energy ratios. The arc of discharge of approximately both electrodes is divided into several branches. A quantity of simultaneously burning spots is determined, first of all, by the instantaneous strength of current of discharge. Author

N83-27129# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
SWITCHING DEVICES
18 Jan. 1983 5 p Transl. into ENGLISH of Gos. Obshchesoyuznyy Standart 17464-72 (USSR), 1972 p 1-3
(AD-A124801; FTD-ID(RS)T-1777-82) Avail: NTIS HC A02/MF A01 CSCL 09/1

The Soviet standard is presented for switching devices with manual and mechanical control: throw-over switches (toggles) and rotating (wafer-type and wiper-type), slide, cam, push-button switches and microswitches designed for use in electrical circuits of direct and alternating currents of electronic equipment. The permissible combinations of values of the basic parameters and also series of values of the time constant of the inductive circuit of the load and number of cycles of the switches (wear resistance) are established. GRA

N83-27130# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
TWO PAPERS ON CIRCUIT EXTRACTION
Anoop Gupta and Robert W. Hon 15 Dec. 1982 28 p refs
(Contract F33615-81-K-1539; ARPA Order 3597)
(AD-A125304; CMU-CS-82-147) Avail: NTIS HC A03/MF A01 CSCL 09/2

The design, implementation and performance of a flat edge based circuit extractor for NMOS circuits is described. The extractor

works on large and complex designs, handles arbitrary geometry, and outputs a comprehensive wirelist. It is shown that run time of the edge based algorithm used is linear in size of the circuit, with low implementation overheads. The extractor analyzes a circuit with 20,000 transistors in less than 30 minutes of CPU time on a VAX 11/780. It is possible to extract a chip a number of times during the same session. The algorithms, implementation and performance of a hierarchical circuit extractor for NMOS designs are also described. The extractor is divided into two parts, a front end and a back end. The front end analyzes the CIF description of a layout and partitions it into a set of nonoverlapping rectangular regions; redundant windows are recognized and are extracted only once. The back end analyzes each unique window found by the front end. The back end determines the electrical circuit represented by the window, and computes an interface that is later used to combine the window with others that are adjacent. An analysis of the expected performance of the algorithm, and the results of running the extractor on some real chip designs are presented. GRA

N83-27131# Thomas Electronics Inc., Wayne N. J.
MANUFACTURING METHODS AND TECHNOLOGY (MM&T) SPECIFICATIONS FOR MINIATURE CATHODE RAY TUBE Quarterly Report, 1 Jul. - 30 Sep. 1982
F. M. Bruno 31 Oct. 1982 15 p
(Contract DAAK70-80-C-0168)
(AD-A124954; TEI-A009-8; QR-8) Avail: NTIS HC A02/MF A01 CSCL 09/1

Two CRT assemblies for the 3rd Submission of Phase 1 - Engineering Samples were source-tested, approved, and accepted by NV&EOL. This successfully concluded the Phase I Engineering Sample requirements of the 1-in. MM&T program. TEI began to manufacture CRT assemblies for Phase 2 - Confirmatory Samples, but placed a hold on production because of inconclusive results during pre-qualification testing. New Five-Position Test Consoles and Test Fixtures became operational. TEI's ATP (Acceptance Test Procedure) was prepared and a draft was submitted to NV&EOL for review and approval. Author (GRA)

N83-27132# California Univ., Berkeley. Lawrence Berkeley Lab. Electronics Research and Development Group.
TRAVELING-WAVE TUBE AMPLIFIER CHARACTERISTICS STUDY FOR STOCHASTIC BEAM-COOLING EXPERIMENTS
Branko Leskovar and C. C. Lo 4 Mar. 1982 14 p refs Presented at the Particle Accelerator Conf., Sante Fe, N. Mex., 21-23 Mar. 1983
(Contract DE-AC03-76SF-00098)
(DE83-005867; LBL-14142; CONF-830311-2) Avail: NTIS HC A02/MF A01

The characteristics of continuous wave wideband traveling wave tube amplifiers was experimentally investigated over a frequency range of 1.5 to 4.5 GHz. Measurements of characteristics important for stochastic beam cooling systems that are generally not available from manufacturers' data sheets are presented. The amplifiers measured include models 1177 H01 and 1277 H01 having output power capabilities of 10 to 20 W, respectively, at frequencies of 2 to 4 GHz. The power transfer characteristics, the phase-shift characteristics as functions of frequency and the input power level, the voltage standing wave ratio, noise drive transfer characteristics, harmonics and intermodulation products content were accurately measured and are discussed. Measurement procedures and description of measuring systems, which include measuring system error corrections, are given in detail. Also several approaches are discussed for the reduction of harmonics and intermodulation products. DOE

N83-27133# Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
THE DEVELOPMENT OF A REDUCED-ORDER FUNCTIONAL REPRESENTATION OF AN ALTERNATOR-RECTIFIER EXCITATION SYSTEM Thesis
Chen-Chen Aug. 1982 70 p refs
(Contract DE-AC02-77ET-29100)
(DE83-006437; TR-EE-82-26) Avail: NTIS HC A04/MF A01

Excitation system models typically employed in power system computations are typically valid only for small changes in rotational speed and only for slowly varying system oscillations. Research has uncovered several situations where the range of accuracy associated with existing excitation system models is exceeded. A tractable, functional representation of a specific class of excitation systems is developed. The accuracy of this simplified model is evaluated by comparing the steady state and dynamic characteristics of the simplified model with a highly detailed excitation system representation. The simplified model is shown to be reasonably accurate over a wide range of operating conditions. DOE

N83-27134# Sandia Labs., Albuquerque, N. Mex.
SANDIA MICRO GENERATION FOR INTEGRATED CIRCUITS (SMAGIC) SYSTEM AND THE HIERARCHICAL ARTWORK (HAT) LANGUAGE
B. D. Richard 1982 13 p refs Presented at IEEE Conf. on Circuits and Computers, New York, 29 Sep. 1982
(Contract DE-AC04-76DP-00789)
(DE82-009912; SAND-82-0022C; CONF-820908-2) Avail: NTIS HC A02/MF A01

SMAGIC provides a capability for generating the artwork directives associated with large hierarchically designed integrated circuits. The principal input to the SMAGIC system is the circuit description specified using the HAT language. The new language provides for specification of the usual geometric entities, for documentation internal to the artwork files and, even more significantly, for several PASCAL-like programming constructs. DOE

N83-27135# Ames Lab., Iowa. Microelectronics Research Center.
ALUMINUM NITRIDE THIN FILM AND COMPOSITE BULK WAVE RESONATORS
K. M. Lakin, J. S. Wang, and A. R. Landin 1982 14 p refs Presented at the 36th Ann. Freq. Control Symp., Philadelphia, 4 Jun. 1982 Sponsored by AFOSR
(Contract W-7405-eng-82)
(DE82-019303; IS-M-396; CONF-820698-1) Avail: NTIS HC A02/MF A01

Recent results on the temperature compensated composite bulk wave resonators and edge-only supported thin film resonators using aluminum nitride as the piezoelectric material are described. The composite resonator structures are similar to those reported previously using ZnO fiels on Si membranes. Highly overmoded resonators using piezoelectric fields were also reported with some performing at microwave frequencies. DOE

N83-27136# California Univ., Livermore. Lawrence Livermore Lab.
DOMED-GRID-CATHODE PROJECT PHASES 1 AND 2
J. W. Kendall 14 Apr. 1982 7 p refs
(Contract W-7405-eng-48)
(DE82-013844; UCRL-15455) Avail: NTIS HC A02/MF A01

The feasibility of increasing the cathode area of a planar triode by use of spherical (domed grid-cathode) geometry was investigated. Early experiments conducted on a standard production planar triode with 2 sq cm cathode hinted at grid dissipation at least double those of standard planar triodes with no degradation of performance. Phase I of this project was set up to fully evaluate the performance of a standard production planar triode (Y730) refitted with a domed grid-cathode structure. If possible, a Y-690 was also to be fitted with the domed grid cathode structure for evaluation. Phase II of the project included design of a 3 sq cm domed grid cathode structure to fit within the Y-730 envelope. The geometry (spacing, grid mesh) from the Y-690 was also to be used. This structure was to be evaluated as to grid dissipation and performance. Progress is reported. DOE

N83-27137# Sandia Labs., Albuquerque, N. Mex.
DIELECTRICS FOR RADIATION-HARD CAPACITORS: POLYVINYLIDENE FLUORIDE AND POLYETHYLENE TEREPHTHALATE

S. R. Kurtz and R. C. Hughes May 1982 40 p refs
(Contract DE-AC04-76DP-00789)
(DE82-019903; SAND-82-0558) Avail: NTIS HC A03/MF A01

Pulsed X-ray photoconductivity measurements in polyvinylidene fluoride (PVF2) films reveal that the photoconductivity is a factor of 10 to 100 smaller than polyethylene terephthalate (PET) films which are commonly used in capacitors. To date this is the smallest photoconductivity observed in a polymer film. The properties of both PVF2 and PET which contribute to the observed photoresponses, and a detailed comparison is made between these materials. In each case, the data are analyzed using the present models for dispersive transport in disordered materials. Data are presented for several structurally different PVF2 films, and the effects of different device operating conditions on the photoconductivity of PVF2 are discussed. DOE

N83-27138# Sandia Labs., Albuquerque, N. Mex.
COMPUTER ASSISTANCE FOR THE DESIGN OF ELECTRONIC COMPONENTS
George Urish 1982 21 p Presented at the Intern. Congr. on Technol., Pittsburgh, 3 May 1982
(Contract DE-AC04-76DP-00789)
(DE82-008920; SAND-82-0651C; CONF-820525-1) Avail: NTIS HC A02/MF A01

Computer assistance is now being applied to the design, analysis, manufacture and testing of electronic products. Systems are available that provide significant reductions in the total design cycle time. For large scale integrated circuits, requirements have already reached the point that without CAD techniques, today's circuits could not be designed. DOE

N83-27139# Science Applications, Inc., Palo Alto, Calif.
DEVELOPMENT OF VARIABLE-SHAFT-SPEED ALTERNATOR
G. Rothbart and R. Fullwood Feb. 1982 165 p refs
(Contract DE-FC07-80ID-12203)
(DE82-012334; DOE/ID-12203/T1) Avail: NTIS HC A08/MF A01

A variable shaft speed alternator (VSSA) consists of an ordinary unmodified 1-1/2 Hp wound-rotor motor, with polyphase excitation controlled by solid state switching and a hybrid of analog and digital circuitry. This circuitry senses both shaft speed and line phase resulting in logic levels which control the current flow in each rotor coil. A first order polynomial was found using the least-squares regression method which accurately expressed the relationship among shaft speed, excitation power, and output power, VSSA torque was inferred from observations to be proportional to output power. Efficiency for converting mechanical power to electrical was inferred over a range of shaft speeds. A break-even speed below which no net power is produced was observed to be 0.375 of the synchronous speed for all output power levels. Similar behavior was observed with power fed to the power network (grid). Additional measurements involved VSSA performance at various power factors. DOE

N83-27140# Lincoln Lab., Mass. Inst. of Tech., Lexington.
ISOLATION TRANSFORMERS FOR UTILITY-INTERACTIVE PHOTOVOLTAIC SYSTEMS
Edward C. Kern, Jr. Dec. 1982 34 p refs
(Contract DE-AC02-76ET-20279)
(DE83-006914; DOE/ET-20279/237) Avail: NTIS HC A03/MF A01

Isolation transformers are used in some photovoltaic systems to isolate the photovoltaic system common mode voltage from the utility distribution system. In early system experiments with grid connected photovoltaics, such transformers were the source of significant power losses. A project at the Lincoln Laboratory and at Allied Chemical Corporation developed an improved isolation transformer to minimize such power losses. Experimental results and an analytical model of conventional and improved transformers are presented, showing considerable reductions of losses associated with the improved transformer. DOE

N83-27141# General Electric Co., St. Petersburg, Fla. Neutron Devices Dept.
ANODE PHENOMENA IN VACUUM ARCS
H. Craig Miller 20 Feb. 1983 65 p refs
(Contract DE-AC04-76DP-00656)
(DE83-007181; GEPP-TIS-657) Avail: NTIS HC A04/MF A01

Arc modes at the anode, anode temperature measurements, anode ions, transitions of the arc into various modes (principally the anode spot mode), and theoretical explanations of anode phenomena are reviewed. Characteristically this anode spot has a temperature near the atmospheric boiling point of the anode material and is a copious source of vapor and energetic ions. With sufficient increase in arc current or arcing time these will usually combine to form a single large active anode spot. The dominant mechanism controlling the transition of the vacuum arc into the anode spot mode depends upon the electrode geometry, the electrode material, and the current waveform of the particular vacuum arc being considered. However, the most probable explanation of anode spot formation is a combination theory, which considers magnetic constriction in the plasma together with the thermal, mechanical, and electrical effects of the anode in analyzing the interaction between the gap plasma near the anode and the anode itself. DOE

N83-27142# Research Inst. of National Defence, Linkoeping (Sweden). Dept. 3.
ELECTROMAGNETIC PULSE PROTECTIVE PROPERTIES IN TRANSIENT SUPPRESSORS CONSISTING OF GAS DISCHARGE TUBES AND FILTERS
Berndt Backlund, Sven Garmland, Torbjoern Karlsson, and Goeran Unden Feb. 1983 47 p ref In SWEDISH; ENGLISH summary
(FOA-C-30312-A3) Avail: NTIS HC A03/MF A01

The effect of the components of a transient suppressor on the protective function, of the device were studied. Measurements show that the operation of the gas tubes requires low inductive connectors. An injected pulse with a rate of rise of 20 A/nsec lights the tubes within less than 2 nsec. The filter consists of an inductor and a Zener diode. The residual voltage is attenuated by the inductor, while the high frequency components pass due to stray capacitance. The Zener diode clamps the voltage only at the low frequency part. Calculations for a model theoretical circuit are presented. Author (ESA)

N83-27143# Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. Electronique et Physique.
DESIGN OF ACTIVE IMPEDANCE MICROWAVE MONOLITHIC CIRCUITS WITH A GaAs SUBSTRATE Ph.D. Thesis [CONCEPTION DE CIRCUITS MONOLITHIQUES MICROONDES AsGa A IMPEDANCES ACTIVES]
Pierre Jaffre 15 Dec. 1982 166 p refs In FRENCH
(ENST-E-82012) Avail: NTIS HC A08/MF A01

The characteristics and applications up to 20 GHz of microwave circuits of monolithic GaAs substrate integrated circuits are analyzed. The use of metallic-semiconductor junction field effect transistors (MESFET) and of Schottky barriers is emphasized. Circuit synthesis by bipolar impedance analysis or by impedance conversion and inversion (using the MESFET as a tension controlled current source as in lower frequency design) is analyzed. A high performance implementation of active RC networks on GaAs substrate is proposed. The design problems of such circuits are discussed. The advantages for microwave amplifier design are detailed. Author (ESA)

N83-27739# Stanford Linear Accelerator Center, Calif.
CID THERMIONIC GUN SYSTEM
R. F. Koontz *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 62-64 refs (For primary document see N83-27724 16-70)
(Contract DE-AC03-76SF-00515)
Avail: NTIS HC A17/MF A01

N83-27740# Atomic Energy of Canada Ltd., Chalk River (Ontario). Accelerator Physics Branch.

CONSTRUCTION OF A HIGH-POWER RF RESONANT TEST LOAD
J. Ungrin, J. C. Brown, B. G. Chidley, S. B. Hodge, G. E. McMichael, S. O. Schriber, and R. B. Turner *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 68-70 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27754# Los Alamos Scientific Lab., N. Mex.
CAVITY LOADING ASSOCIATED WITH HIGH-CURRENT RF LINACS
Ricky J. Faehl, Don S. Lemons, and Lester E. Thode *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 137-141 refs Sponsored by AFOSR (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27761# National Lab. for High Energy Physics, Ibaraki-Ken (Japan).
THE RF SYSTEM OF THE PHOTON FACTORY INJECTOR LINAC
S. Anami, J. Tanaka, S. Fukuda, T. Shidara, Y. Saito, R. Bissonnette, and H. Honma *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 177-179 (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27762# Atomic Energy of Canada Ltd., Chalk River (Ontario). Accelerator Physics Branch.
DESIGN CONSIDERATIONS FOR A DEVELOPMENTAL HIGH POWER COUPLING LOOP TO DRIVE A RESONANT LOAD
J. C. Brown and R. M. Hutcheon *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 180-182 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27782# Fermi National Accelerator Lab., Batavia, Ill.
THE DISTRIBUTED CONTROL SYSTEM FOR THE FERMILAB 200 MEV LINAC
R. W. Goodwin and M. F. Shea *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 277-280 ref (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27783# Fermi National Accelerator Lab., Batavia, Ill.
MODULATOR RELIABILITY AND BANDWIDTH IMPROVEMENT: REPLACING TETRODES WITH MOSFETS
A. R. Donaldson *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 284-286 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27784# California Univ., Berkeley. Lawrence Berkeley Lab.
LOW-COST MEGAWATT RF POWER SOURCES FOR LINEAR ACCELERATORS TO 70MHZ AND ABOVE
Jock A. Fugitt, Marvin L. Nolan, and Forrester K. Crosby *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 187-289 ref (For primary document see N83-27724 16-70)
(Contract W-7405-eng-48)
(LBL-13024) Avail: NTIS HC A17/MF A01

N83-27785# California Univ., Berkeley. Lawrence Berkeley Lab.
AN ANALYTICAL SOLUTION FOR THE ELECTRICAL PROPERTIES OF A RADIO FREQUENCY QUADRUPOLE (RFQ) WITH SIMPLE VANES
H. Lancaster *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 293-295 refs (For primary document see N83-27724 16-70)
(Contract W-7405-eng-48)
Avail: NTIS HC A17/MF A01

N83-27789# Tokyo Univ. (Japan). Inst. for Nuclear Study.
NEW FORMULATION OF THE RFQ RADIAL MATCHING SECTION
N. Tokuda and S. Yamada *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 313-315 refs Prepared in cooperation with Lawrence Berkeley Lab., Calif. (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

N83-27144* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CURVED FILM COOLING ADMISSION TUBE Patent
Robert W. Graham and S. Stephen Papell, inventors (to NASA) Issued 27 Oct. 1980 6 p Filed 27 Oct. 1980 Supersedes N81-12363 (19 - 03, p 0343)
(NASA-Case-LEW-13174-1; US-Patent-4,384,823; US-Patent-Appl-SN-200634; US-Patent-Class-416-1; US-Patent-Class-415-115; US-Patent-Class-416-97R) Avail: US Patent and Trademark Office CSCL 20D

Effective film cooling to protect a wall surface from a hot fluid which impinges on or flows along the surface is provided. A film of cooling fluid having increased area is provided by changing the direction of a stream of cooling fluid through an angle of from 135 deg. to 165 deg. before injecting it through the wall into the hot flowing gas. The 1, cooling fluid is injected from an orifice through a wall into a hot flowing gas at an angle to form a cooling fluid film. Cooling fluid is supplied to the orifice from a cooling fluid source via a turbulence control passageway having a curved portion between two straight portions. The angle through which the direction of the cooling fluid is turned results in less mixing of the cooling fluid with the hot gas, thereby substantially increasing the length of the film in a downstream direction.

Official Gazette of the U.S. Patent and Trademark Office

N83-27145 National Maritime Inst., Feltham (England).
OBSERVATION AND MEASUREMENT OF AIR FLOW OVER WATER WAVES
M. A. Weissmann Jan. 1982 36 p refs Sponsored by Ship and Marine Technology Requirements Board
(NMI-R-122) Copyright. Avail: Issuing Activity

Flow visualization and measurement experiments were conducted in a wind/wave facility to determine the characteristics of boundary layer separation in an air flow over small or large water waves. The existence of separation would invalidate the adoption of linear models which cannot describe large recirculation regions. Flow separation is found to occur within the turbulent boundary layer over short gravity waves of 10 cm wavelength under 1 m/sec wind when the waves are not breaking (wave height/wave length less than 06).

Author (ESA)

N83-27146 National Maritime Inst., Feltham (England).
MEAN WAVE DRIFT FORCES: THEORY AND EXPERIMENT
R. G. Standing, N. M. C. Dacunha, and R. B. Matten Dec. 1981 107 p refs Sponsored by Offshore Energy Technology Board
(NMI-R-124; OT-R-8175) Copyright. Avail: Issuing Activity

A computer program based on linear wave diffraction theory used to compute first-order wave forces was extended to compute mean and slowly varying components of the second order wave force. The underlying theory and experimental validation of the new program are described. Comparisons with published data and with other prediction formula currently in use are made. Theoretical and experimental forces are found to agree excellently in regular wave conditions, but slightly less well in irregular seas.

Author (ESA)

N83-27147 National Maritime Inst., Feltham (England).
INTERFERENCE EFFECTS ON THE DRAG LOADING FOR GROUPS OF CYLINDERS IN UNI-DIRECTIONAL FLOW
H. H. Pearcey, R. F. Cash, I. J. Salter, and A. Boribond Sep. 1982 102 p refs
(Contract OETB-Proj-3/071)
(NMI-R-130; OT-R-8256) Copyright. Avail: Issuing Activity

Tests on two or more cylinders in tandem demonstrate that the interference effects for applications at high Reynolds numbers can be derived from tests at substantially lower Reynolds numbers provided that the relevant post-critical flows are appropriately simulated. The tests on tandem cylinders demonstrate that interference effects for application in a significant range of Reynolds numbers below those for which post-critical flows occur naturally, can only reliably be determined by tests at the correct Reynolds numbers. The interference effects for post-critical conditions and those that occur naturally at lower Reynolds numbers are compared. The interference effects are reasonably predictable at Reynolds numbers above 50,000 because the boundary layer transition is far forward on the cylinders, and below 10,000 because variations with the Reynolds number are not to be expected. Author (ESA)

N83-27148*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
CALCULATION OF BOUNDARY LAYERS NEAR THE STAGNATION POINT OF AN OSCILLATING AIRFOIL
Tuncer Cebeci (California State Univ., Long Beach) and Lawrence W. Carr May 1983 17 p refs Prepared in cooperation with Army Research and Technology Labs., Moffett Field, Calif.
(NASA-TM-84305; A-9143; NAS 1.15:84305; USAAVRADCOM-TR-83-A-1) Avail: NTIS HC A02/MF A01 CSCL 20D

The results of an investigation of boundary layers close to the stagnation point of an oscillating airfoil are reported. Two procedures for generating initial conditions, the characteristics box scheme and a quasi-static approach, were investigated, and the quasi-static approach was shown to be appropriate provided the initial region was far from any flow separation. With initial conditions generated in this way, the unsteady boundary layer equations were solved for the flow in the leading edge region of a NACA 0012 airfoil oscillating from 0 to 5 deg. Results were obtained for both laminar and turbulent flow, and, in the latter case, the effect of transition was assessed by specifying its occurrence at different locations. The results demonstrate the validity of the numerical scheme and suggest that the procedures should be applied to calculation of the entire flow around oscillating airfoils. Author

N83-27149*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
IMPLICIT UPWIND METHODS FOR THE COMPRESSIBLE NAVIER-STOKES EQUATIONS
T. J. Coakley May 1983 13 p refs Proposed for presentation at the AIAA Computational Fluid Dyn. Conf., Danvers, Mass., 13-15 Jul. 1983
(NASA-TM-84364; A-9332; NAS 1.15:84364) Avail: NTIS HC A02/MF A01 CSCL 20D

A class of implicit upwind differencing methods for the compressible Navier-Stokes equations is described and applied. The methods are based on the use of local eigenvalues or wave speeds to control spatial differencing of inviscid terms and are aimed at increasing the level of accuracy and stability achievable in computation. Techniques for accelerating the rate of convergence to a steady state solution are also used. Applications to inviscid and viscous transonic flows are discussed and compared with other methods and experimental measurements. It is shown that accurate and efficient transonic airfoil calculations can be made on the Cray-I computer in less than 2 min. Author

N83-27150*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
HEAT-TRANSFER DISTRIBUTIONS ON BICONICS AT INCIDENCE IN HYPERSONIC-HYPERVELOCITY He, N2, AIR, AND CO2 FLOWS
Charles G. Miller, John R. Micol, Peter A. Gnofo, and Sue E. Wilder May 1983 20 p refs Presented at the 18th AIAA Thermophys. Conf., Montreal, Quebec, 1-3 Jun. 1983
(NASA-TM-84667; NAS 1.15:84667) Avail: NTIS HC A02/MF A01 CSCL 20D

Laminar heat transfer rates were measured on spherically blunted, 13 deg/7 deg on axis and bent biconics (fore cone bent 7 deg upward relative to aft cone) at hypersonic hypervelocity flow conditions in the Langley Expansion Tube. Freestream velocities from 4.5 to 6.9 km/sec and Mach numbers from 6 to 9 were generated using helium, nitrogen, air, and carbon dioxide test gases, resulting in normal shock density ratios from 4 to 19. Angle of attack, referenced to the axis of the aft cone, was varied from 0 to 20 deg in 4 deg increments. The effect of nose bend, angle of attack, and real gas phenomena on heating distributions are presented along with comparisons of measurement to prediction from a code which solves the three dimensional parabolized Navier-Stokes equations. Author

N83-27151*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
HEATING MEASUREMENTS ON SPACE SHUTTLE ORBITER MODELS WITH DIFFERENTIALLY DEFLECTED ELEVONS
William L. Wells May 1983 62 p refs
(NASA-TM-84646; NAS 1.15:84646) Avail: NTIS HC A04/MF A01 CSCL 20D

The phase change paint technique was used to make heat transfer measurements on the windward wing/elevons area of Space Shuttle Orbiter models with differentially deflected elevons. Outboard elevons were deflected windward at angles from 0 to 20 deg. The inboard elevons were deflected leeward. The models were tested in air at Mach 6 and 10 with two flow conditions and three angles of attack for both Mach numbers. Heat transfer coefficient contour maps of the wing/elevon area were obtained for all test conditions. The maximum heat transfer coefficient on the outboard elevon and on certain areas of the wing that were obtained when the elevons were deflected are compared to values obtained when the elevons were undeflected. Author

N83-27152*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
INTERACTION OF MULTIPLE SUPERSONIC JETS WITH A TRANSONIC FLOW FIELD
Arnan Seginer and Jonah Manela (Armanecs Development Authority, Haifa, Israel) May 1983 26 p refs Presented at the 16th AIAA Fluid and Plasma Dyn. Conf., Danvers, Mass., 12-14 Jul. 1983
(NASA-TM-84369; A-9331; NAS 1.15:84369) Avail: NTIS HC A03/MF A01 CSCL 11D

The influence of multiple high pressure, supersonic, radial or tangential jets, that are injected from the circumference of the base plane of an axisymmetric body, on its longitudinal aerodynamic coefficients in transonic flow is studied experimentally. The interaction of the jets with the body flow field increases the pressures on the forebody, thus altering its lift and static sability characteristics. It is shown that, within the range of parameters studied. This interaction has a stabilizing effect on the body. The contribution to lift and stability is significant at small angles of attack and decreases nonlinearly at higher angles when the crossflow mechanism becomes dominant. Author

N83-27153# University of Southern California, Los Angeles.
RESEARCH ON WALL TURBULENCE Final Report, 22 Jan. 1973 - 31 Aug. 1982
Ron Blackwelder Jan. 1983 10 p refs
(Contract DAAG29-C-0137; Grants DA-ARO-D-31-124-73-G118; DAAG29-76-G-0297)
(AD-A124831; ARO-11170.4-EG; ARO-13681.7-EG) Avail: NTIS HC A02/MF A01 CSCL 20/4

Within the last decade, many of the attributes of turbulent shear flows have been ascribed to large coherent eddy structures. In bounded shear flows, there appeared to be two distinct coherent

eddies; one which governs the outer flow field and is responsible for entrainment in the case of turbulent boundary layers, and the second which dominates the wall region near the boundary. The research reported here concentrated on the wall region which is dominated by the bursting phenomenon consisting of several distinct characteristics. GRA

N83-27154# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Turbine Engine Div.
REVISION OF THE SHOCK LOSS RE-ESTIMATION PROCEDURE OF PROGRAM UDO300 UTILIZING A THREE-DIMENSIONAL SHOCK MODEL Interim Report, 1 Aug. 1980 - 1 Aug. 1981
Steven L. Puterbaugh and Arthur J. Wennerstrom Dec. 1982 25 p refs
(AF Proj. 2307)
(AD-A124928; AFWAL-TR-82-2079) Avail: NTIS HC A02/MF A01 CSCL 12/1

A new subroutine and several modified subroutines of program UD0300 are presented along with a discussion of the three-dimensional shock model used in their development. The basis for the model is found in a paper by D. Prince in Journal of Aircraft. The procedure essentially consists of exploiting the aerodynamic sweep exhibited by a 'shock surface' developed by a spanwise series of normal passage shocks. Author (GRA)

N83-27155# Wisconsin Univ., Madison. Mathematics Research Center.
ON THE QUANTITATIVE ANALYSIS OF LIQUID FLOW IN PHYSIOLOGICAL TUBES Technical Summary Report
H. Winet Dec. 1982 88 p refs
(Contract DAAG29-80-C-0041; Grant HD-51442)
(AD-A125284; MRC-TSR-2456) Avail: NTIS HC A05/MF A01 CSCL 06/16

We review three benchmark quantitative models for flow generation by physiological tube pumps. In each case significant differences between model predictions and tube behavior was emphasized. In order to close these gaps both modeler and Physiologist (often the same investigator) need to find paths which can grow to bridges. The modeler must develop more exact solutions to provide Physiologists with plug-in equations which will accept measurements. The Physiologist must make the kind of measurements which can be reasonably tested by a meaningful model. The measurements which have been features in this review are pressure, viscosity and geometry--or where geometry varies with time, kinematic data. A number of diagnostic marker formulas have been presented as stepping stones to modeling. These include R sub e, Beta, slenderness etc. which translates physiological data into indicators for modeling directions. GRA

N83-27156# California Univ., Livermore. Dept. of Applied Science.
FUNDAMENTAL STUDY OF DENSE-FLUID DETONATION Annual Report, 1 Apr. 1981 - 31 Mar. 1982
William G. Hoover May 1982 20 p refs
(Contract F49620-81-C-0050; ARPA Order 4077; AF Proj. 2306)
(AD-A125300; AFOSR-83-0027TR) Avail: NTIS HC A02/MF A01 CSCL 19/4

Mathematical models of detonation in dense fluids and in solids are investigated. The interaction of pressure waves, or shock waves, with high explosives is studied. The steady state dynamical equations of continuum mechanics, including viscosity, conductivity, and chemical reactions are solved to simulate detonation in fluids capable of undergoing fast exothermic reactions. The coupled ordinary differential equations of motion of molecular dynamics, for solids are solved to simulate the initiation process proceding detonation. Simple models designed to describe the results of these macroscopic and microscopic approaches are examined. Detonation wave profiles are obtained using a realistic dense fluid equation of state. These profiles are compared to the predictions of the simplified Zeldovich-Von Neumann-Doering model. Methods for simulating the rapid uniaxial compression of solids suited to molecular dynamics simulation are developed. GRA

N83-27157# McDonnell-Douglas Research Labs., St. Louis, Mo.
DYNAMIC RESPONSE OF RAMJET INLETS TO DOWNSTREAM PERTURBATIONS Final Report, 1 Jul. 1980 - 31 Jan. 1983
Miklos Sajben, Thomas J. Bogar, and Joseph C. Kroutil 31 Jan. 1983 56 p refs
(Contract N00014-80-C-0481)
(AD-A125295; MDC-Q0784) Avail: NTIS HC A04/MF A01 CSCL 20/4

An external-compression inlet with high-aspect-ratio, rectangular cross sections was investigated in a semi-freejet arrangement at M(infinity) = 1.84 and zero incidence, over a wide range of super- and subcritical conditions. The response of the inlet flows to periodic perturbations imposed at the downstream end was determined. The perturbations were created by mechanical modulation of the choked exhaust area at frequencies from 20 to 360 Hz. The amplitude of the pressure fluctuations induced at the downstream end of the inlet was varied up to 8% of the time-mean static pressure at the same location. The observed oscillations were categorized according to position ranges associated with the shock motion. In supercritical oscillations, the pressure fluctuation amplitudes within the inlet were found to be linearly proportional to the fluctuation intensity at the exit station, establishing the latter as the appropriate quantity for normalization. In subcritical conditions, the inlet displays a large-amplitude natural oscillation (buzz). Superimposed excitation may couple with the natural oscillations in two distinctly different ways, both strongly nonlinear. Combinations of mean flow condition, excitation amplitude, and frequency that cause the terminal shock to move upstream of the cowl or the ramp were determined. GRA

N83-27158# EMC Engineers, Inc., Denver, Colo.
HANDBOOK OF THERMAL INSULATION APPLICATIONS Final Report
Don E. Croy and Douglas A. Dougherty Jan. 1983 427 p refs
(Contract N62474-81-C-9395)
(AD-A125264; NCEL-CR-83.005) Avail: NTIS HC A19/MF A01 CSCL 11/7

This document provides current design information on insulation materials and assemblies for building envelopes and mechanical systems. Compiled data includes thermophysical properties of commonly used generic thermal insulating materials and their application in wall, floor and roof assemblies, door and window assemblies, and in mechanical piping, tanks, vessels, equipment, and air duct installations. Listings of insulation materials are sorted by both manufacturer's trade names and by product descriptions. Plates showing typical new and retrofit installation details for these materials in building assemblies and mechanical systems are provided. How insulation conserves energy, and fundamentals of heat transfer are provided. Information on computer programs for heat transmission, mass and thermal capacity calculations is included. The document can be used to estimate energy savings with thermal insulation in building wall and piping assemblies. Methods for optimizing insulation thicknesses are provided in a section on insulation economics. Author (GRA)

N83-27159# Wisconsin Univ., Madison. Mathematics Research Center.
LINEARIZED STABILITY OF EXTREME SHOCK PROFILES FOR SYSTEMS OF CONSERVATION LAWS WITH VISCOSITY Technical Summary Report
Robert L. Pego Dec. 1982 62 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-79-27062)
(AD-A125256; MRC-TSR-2457) Avail: NTIS HC A04/MF A01 CSCL 12/1

For a genuinely nonlinear hyperbolic system of conservation laws with added artificial viscosity, we prove that traveling wave profiles for small amplitude extreme shocks (the slowest and fastest) are linearly stable to perturbations initial data chosen from certain spaces with weighted norm; i.e., we show that the spectrum of the linearized equation lies strictly in the left half plane, except for a simple eigenvalue at the origin (due to phase translations of the profile). The weight is used in components

transverse to the profile, where, for an extreme shock, the linearized equation is dominated by unidirectional convection. GRA

N83-27160# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
EXPERIMENTAL INVESTIGATION OF THE MIXING OF HIGHLY SWIRLING FLOWS Ph.D. Thesis
Jack Denton Mattingly May 1982 463 p refs
(AD-A125249; AFIT-CI-NR-82-75D) Avail: NTIS HC A20/MF A01 CSCL 20/4

An extensive experimental investigation has been performed of the mixing behavior of incompressible co-annular air streams with substantial swirl present in the inner stream. Four sets of experiments were performed and each set corresponded to a different configuration of the test section. The test section configuration of each of the four sets of experiments were: free annular swirling jet, annular swirling jet with a centerbody, co-annular streams with swirl present in the inner stream and with a centerbody, and co-annular streams with swirl present in the inner stream and with a constant-area annular duct test section. The experimental investigation determined the behavior of the mean flow profiles at several axial locations for the four sets of tests with the most extensive investigation performed in the fourth set of tests. Author (GRA)

N83-27161# Case Western Reserve Univ., Cleveland, Ohio. Fluid Thermal and Aerospace Sciences.
PREDICTION OF NATURAL CONVECTION FLOW PATTERN IN LOW-ASPECT RATIO ENCLOSURES Interim Report
Jinho Lee and Simon Ostrach 26 May 1982 131 p refs
(Grant AF-AFOSR-0045-81; AF Proj. 2307)
(AD-A124995; FTAS/TR-82-158; AFOSR-83-0031TR) Avail: NTIS HC A07/MF A01 CSCL 20/4

The present work deals with the natural convection of a fluid confined within a low aspect ratio rectangular enclosure with differentially heated end walls. The objective is to predict the core flow pattern a priori once the boundary and geometry conditions are given. Multiple scales technique is employed to obtain a proper mathematical model from which the core flow patterns are analyzed based on various force balances. Global analyses show a number of possible core configurations. Detailed analyses lead to predictions for the occurrence of possible flow subregimes, such as secondary cells. Comparison with the existing experimental results shows good agreement. Author (GRA)

N83-27162# Wisconsin Univ., Madison. Mathematics Research Center.
ON STEADY VORTEX FLOW IN TWO DIMENSIONS, 1 Technical Summary Report
Bruce Turkington Jul. 1982 36 p refs 2 Vol.
(Contract DAAG29-80-C-0041; Grant NSF MCS-80-02927)
(AD-A120965; MRC-TSR-2406-1) Avail: NTIS HC A03/MF A01 CSCL 01/1

The purpose of this paper (and its sequel) is to give a mathematically rigorous - as well as physically natural - discussion of certain steady solutions of the Euler dynamical equations for an ideal, two-dimensional fluid. The flows considered have a prescribed distribution of vorticity omega = curl u (u devotes the velocity field), and are separated into regions where omega = 0 and omega > 0. The shape and position of the vortex core (region where omega > 0) for a flow satisfying the dynamical requirements is then determined by the geometry of the fluid domain (assumed bounded here). Solutions of the fluid dynamical equations are most conveniently characterized by a variational principle which involves finding an extreme value for the kinetic energy of the flow subject to certain natural constraints. This approach permits a precise analysis of the properties of solutions to be carried out in a unified manner. In this respect, special emphasis is placed upon deriving the (classical) point vortex as the limit of solutions with concentrated vorticity. GRA

N83-27163# Wisconsin Univ., Madison. Mathematics Research Center.
ON STEADY VORTEX FLOW IN TWO DIMENSIONS, 2 Technical Summary Report
Bruce Turkington Jul. 1982 45 p refs 2 Vol.
(Contract DAAG29-80-C-0041; Grant NSF MCS-80-02927)
(AD-A120966; MRC-TSR-2407-2) Avail: NTIS HC A03/MF A01 CSCL 01/1

We extend the results of our previous work concerning steady ideal flow with vorticity in a bounded domain to the situation where the domain is unbounded and the flow is uniform at infinity. Prototypical examples include vortex pairs and Foppl vortex wakes behind a cylinder. The existence of solutions and the asymptotic behavior of these solutions in a certain singular limit are established as in part 1 using a direct variational method. The variational principle needed here is rather nonstandard, and so a detailed discussion of its formulation is given. Special difficulties arise for flows in an unbounded domain due to a lack of compactness; consequently, we find that there is nonexistence of solutions in some cases. Author (GRA)

N83-27164# Wisconsin Univ., Madison. Mathematics Research Center.
BOUNDARY CONDITIONS FOR SUPPRESSING RAPIDLY MOVING COMPONENTS IN HYPERBOLIC SYSTEMS, 1 Technical Summary Report
Robert L. Higdon Jul. 1982 45 p refs Prepared in cooperation with Stanford Univ. 2 Vol.
(Contracts DAAG29-80-C-0041; N00014-75-C-1132; Grant NSF MCS-79-27062)
(AD-A120962; MRC-TSR-2403) Avail: NTIS HC A03/MF A01 CSCL 20/4

This work is concerned with hyperbolic systems of partial differential equations for which certain of the associated propagation speeds are a great deal larger than the other proposition speeds. Our goal is to find boundary conditions which prevent rapidly moving waves from entering the given spatial domain. Conditions of this type are desirable in certain numerical computations arising in meteorology. In order to find these conditions, we first transform the given system to an approximate diagonal form in such a way that each of the new dependent variables can be identified as a slow, incoming fast, or outgoing fast component of the solution. We then find local boundary conditions which suppress the incoming fast part. Pseudo-differential operators are used throughout the entire process. We consider only linear systems. In Part II of this work (7) these methods are applied in detail to the linearized shallow water equations. The results of numerical tests of various boundary conditions are included in both papers. We also outline a method by which the conditions can be justified analytically. Author (GRA)

N83-27165# Wisconsin Univ., Madison. Mathematics Research Center.
BOUNDARY CONDITIONS FOR SUPPRESSING RAPIDLY MOVING COMPONENTS IN HYPERBOLIC SYSTEMS. 2: AN EXAMPLE Technical Summary Report
Robert L. Higdon Jul. 1982 34 p refs Prepared in cooperation with Stanford Univ. 2 Vol.
(Contracts DAAG29-80-C-0041; N00014-75-C-1132; Grant NSF MCS-79-27062)
(AD-A120963; MRC-TSR-2404-2) Avail: NTIS HC A03/MF A01 CSCL 20/4

THIS PAPER IS A CONTINUATION OF 2. Here we apply the ideas of that paper to the linearized shallow water equations, or, equivalent, the linearized two-dimensional isentropic Euler equations of gas dynamics. Author (GRA)

N83-27166# Los Alamos Scientific Lab., N. Mex.
DESIGN AND DEVELOPMENT OF A TITANIUM HEAT-PIPE SPACE RADIATOR
Steven P. Girrens Mar. 1982 29 p refs
(Contract W-7405-eng-36)
(DE82-013749; LA-9251-MS) Avail: NTIS HC A03/MF A01

A titanium heat-pipe radiator was designed for use in a 100-kW/sub e/ nuclear-thermoelectric (TE) space power plant. The radiator is required to have a 99% probability of remaining

functional at full power at the end of a seven-year mission. The radiator has a conical-cylindrical shape and is compatible for launch in the space shuttle. The radiator heat pipes are arranged into panel segments and each reactor-core thermoelectric heat-pipe unit has four radiator heat pipes for redundancy. Radiator mass was minimized based on acceptable losses due to micrometeoroid impact. Results of studies on various design parameters are presented in terms of radiator mass. Developments on the design and testing of the radiator heat pipes are also presented. Prototype titanium (potassium working fluid) heat pipes were fabricated and tested in space-simulating conditions. Testing results are compared to analytical performance predictions. DOE

N83-27167# Sandia Labs., Albuquerque, N. Mex. Fluid Mechanics and Heat Transfer Div.

MARIAH: A FINITE-ELEMENT COMPUTER PROGRAM FOR INCOMPRESSIBLE POROUS-FLOW PROBLEMS, USER'S MANUAL

David K. Gartling and Charles E. Hickox Jan. 1983 104 p refs
(Contract DE-AC04-76DP-00789)
(DE83-006847; SAND-79-1623-Rev) Avail: NTIS HC A06/MF A01

MARIAH is a finite-element computer program designed for the solution of two-dimensional, incompressible flows in a porous media, including the effects of heat transfer. The program capabilities and complete user instructions are presented. Several example problems are described in detail to demonstrate the user of the program. DOE

N83-27168# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

FLASH EVAPORATION FROM TURBULENT WATER JETS

Desikan Bharathan and Terry Penney Feb. 1983 14 p refs Presented at the ASME-JSME Thermal Eng. Joint Conf., Honolulu, Hawaii, 20-24 Mar. 1983
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE83-007311; SERI/TP-252-1853; CONF-830301-8) Avail: NTIS HC A02/MF A01

Results of an experimental investigation of flash evaporation from turbulent planar and axisymmetric water jets are reported. In the range of jet thicknesses tested, for planar jets, due to shattering, evaporation is found to be nearly independent of the jet thickness. Evaporation from the planar jets was found to be dependent on the initial level of turbulence in the water supply manifold. An approximate analysis to model the evaporation process based on the physical phenomena and experimental observations is outlined. Comparisons between the experimental data and analytical predictions of the liquid temperature variation along the jet are included. Use of screens in the water jet are shown to be effective for enhancing evaporation. DOE

N83-27169# Sandia Labs., Albuquerque, N. Mex. Combustion Research Div.

A GENERAL-PURPOSE COMPUTER CODE FOR PREDICTING CHEMICAL-KINETIC BEHAVIOR BEHIND INCIDENT AND REFLECTED SHOCKS

Reginald E. Mitchell and Robert J. Kee Mar. 1982 31 p refs
(Contract DE-AC04-76DP-00789)
(DE82-015878; SAND-82-8205) Avail: NTIS HC A03/MF A01

A computer code which is used to predict the chemical changes which occur after the shock heating of reactive gas mixtures is described. The code is designed to handle both incident and reflected shock waves. It makes allowances for real gas behavior, boundary layer effects and detailed finite rate chemistry. The code is intended to be used in conjunction with shock tube experiments. Computer simulation of such experiments is valuable to the interpretation of the experimental results and to the understanding of the chemical kinetic behavior. DOE

N83-27170# Sandia Labs., Albuquerque, N. Mex. Process Research Div.

MASS FLOW MEASUREMENT OF SOLIDS/GAS STREAM USING RADIOMETRIC TECHNIQUES

James K. Linn and David G. Sample 1982 18 p refs Presented at the Symp. on Instr. and Control for Fossil Energy Processes, Houston, Tex., 7 Jun. 1982
(Contract DE-AC04-76DP-00789)
(DE82-017028; SAND-82-0228C; CONF-820612-3) Avail: NTIS HC A02/MF A01

A mass flowmeter utilizing radiometric techniques was designed and built for measuring flows in two phase gas/solids feed streams in coal gasification processes. The instrument combines a radiometric density measurement and a time cross correlation velocity determination into a nonintrusive gas/solids mass flowmeter. Accuracies of 5 to 10% are anticipated for flow with 10% solids fraction and velocities of one to five meters per second. The theory, the relevant radiometric cross sectional background data, and the developed system digital data handling are described. DOE

N83-27171# Sandia Labs., Albuquerque, N. Mex.

LABORATORY SIMULATION OF A DEEP-OCEAN IN-SITU HEAT-TRANSFER EXPERIMENT

C. M. Percival 1982 6 p refs Presented at the Marine Technol. Soc. and Geol. Soc. of Am. Conf. on Oceans, Washington, 20 Sep. 1982
(Contract DE-AC04-76DP-00789)
(DE82-018656; SAND-82-1553C; CONF-820926-2) Avail: NTIS HC A02/MF A01

The Subseabed Disposal Program completed a 30 day, 0.286 scale laboratory simulation of an in situ heat transfer experiment. It is scheduled for eventual deployment in the deep ocean 600 nautical miles north of Hawaii. DOE

N83-27172# Levy (Salomon), Inc., Campbell, Calif.

CRITICAL FLOW DATA REVIEW AND ANALYSIS Final Report

D. Abdollahian, J. Healzer, E. Janssen, and C. Amos Jan. 1982 270 p refs
(EPRI Proj. 1438-1)
(DE82-902199; EPRI-NP-2192) Avail: NTIS HC A12/MF A01

The Marviken critical flow data at large scale and the first to test nozzle sizes up to 0.5m. This report presents a survey of two-phase critical flow tests before Marviken and a summary of the results and parametric trends in the Marviken data. It also compares the Marviken blowdowns to predictions by several existing two-phase critical flow models. Conclusions of the study are that the large scale Marviken data behaves very much like smaller scale two-phase critical flow data and it can be predicted with existing critical flow models if non-equilibrium effects are properly treated. DOE

N83-27173# Westinghouse Electric Corp., Pittsburgh, Pa. Heat Exchange Systems Research Dept.

OPTIMIZED TWO-CAPACITY ADVANCED ELECTRIC HEAT PUMP

S. E. Veyo 1982 40 p refs Presented at the ASHRAE Natl. Meeting, Toronto (Canada), 27 Jun. - 1 Jul. 1982
(Contract W-7405-eng-26)
(DE82-017447; CONF-820664-5) Avail: NTIS HC A03/MF A01

A two-capacity residential electric heat pump utilizing a unique dual-stroke compressor was developed, designed, constructed in preprototypic form and laboratory tested. The estimated annual energy efficiency of this system is twenty percent better than a presently available two-speed electric heat pump. A computer based constrained optimization procedure was used to elect heat exchanger proportions, air flow rates and compressor stroke ratio in order to minimize the annual ownership cost subject to comfort constraints upon delivered air temperature and dehumidification. A high-efficiency dual-stroke compressor, indoor blower and outdoor fan plus a microprocessor based control system were specifically developed for this system. The hardware development is highlighted and system and component performance is summarized. DOE

N83-27174# Lulea Univ. (Sweden). Div. of Water Resources Engineering.
A TURBULENCE MODEL FOR DEPTH-AVERAGED EQUATIONS OF MOTION
Urban Svensson 1981 11 p refs Presented at EUROMECH 130 Colloq., Belgrade, 30 Jun. - 3 Jul. 1980; Sponsored by Yugoslav Association for Hydraulic Research and Yugoslav Assocation for Rational and Applied Mechanics
(TULEA-1981-07; Ser-A-57; ISSN-0347-0881) Avail: NTIS HC A02/MF A01

Two dimensional flow in the horizontal plane driven by a pressure gradient is modeled. Steady flow and pressure gradient drive are assumed. Momentum equations in which the stresses represent depth averaged values are presented. Expressions for the Reynolds stresses necessary to solve these equations are derived. All the equations are algebraic, and are easy to adapt to any computer program which solves two dimensional equations of motion. Author (ESA)

N83-27175# Hoegskolan i Luleaa (Sweden). Dept. of Mechanical Engineering.
DYNAMICS OF THREE-DIMENSIONAL DISTURBANCES IN WATER TABLE FLOW
L. Haakan Gustavsson 1982 25 p refs
(TULEA-1982-36-T; ISSN-0349-3571) Avail: NTIS HC A02/MF A01

The development of small three-dimensional disturbances on a water table is considered for Reynolds numbers less than 2000. Disturbances can grow either through a direct resonance between the vertical velocity and the vertical vorticity or through an instability associated directly with the Orr-Sommerfeld equation. Four direct resonances were investigated with respect to propagation speeds, wave numbers and growth rates. The phase speeds range from 0.67 to 0.70 of the free surface speed and for Reynolds numbers of interest for transition to turbulence the structures resonantly amplified are highly elongated in the streamwise direction. Two of the resonances are found to be removable by a decrease in the slope of the water table. The unstable mode which propagates faster than the free surface speed is found to be most unstable for waves propagating in the mean flow direction. Author (ESA)

N83-27176# Hoegskolan i Luleaa (Sweden). Dept. of Mechanical Engineering.
OBSERVATIONS OF TURBULENT SPOTS ON A WATER TABLE
L. Haakan Gustavsson and Jan-Erik Oegren 1982 49 p refs
(TULEA-1982-039-T) Avail: NTIS HC A03/MF A01

Turbulent spots on a water table were studied. The Reynolds number, based on the surface speed and the water depth, at which spots can first be generated, is found to be in the range 950 to 1050. The influence of the Reynolds number and the slope of the water table on the propagation speeds of the front and the rear of the spot and on the half angle of spread was determined. A photographic technique was used to register structures within the spot. Comparisons with the theory of direct resonant growth of vertical vorticity show that the theory accounts fairly well for the spreading angle of the spot whereas the propagation speeds of the front and the rear are larger than the observed values.
Author (ESA)

N83-27177# Karlsruhe Univ. (West Germany). Ausbreitungs- und Transportvorgaenge in Stroemungen.
EXPERIMENTAL INVESTIGATION OF JETS IN A CROSS FLOW
J. Andreopoulous and W. Rodi Oct. 1982 69 p refs Sponsored by Deutsche Forschungsgeimschaft
(KU-SFB-80/E/219) Avail: NTIS HC A04/MF A01

Measurements in the flow generated by a jet issuing from a circular outlet in a wall into a cross stream along this wall are reported. For the jet-to-cross-flow velocity ratios (R) of 0.5, 1 and 2, the wall pressure was measured with standard taps and the mean and fluctuating velocity components with a three-sensor hot-wire probe. The hot-wire signals yield the three mean velocity components, the turbulent kinetic energy, the three turbulent shear stresses and, in the case of R = 0.5, the terms in the turbulent kinetic energy equation. The results give a quantitative picture of the complex three-dimensional flow pattern and the various phenomena. The dependence of flow phenomena on R is discussed. Author (ESA)

N83-27178# Karlsruhe Univ. (West Germany). Ausbreitungs- und Transportvorgaence in Stroemungen.
CALCULATION OF TURBULENCE-DRIVEN SECONDARY MOTION IN NONCIRCULAR DUCTS
A. O. Demuren and W. Rodi Oct. 1982 62 p refs Sponsored by Deutsche Forschungsgeimschaft
(KU-SFB-80/T/220) Avail: NTIS HC A04/MF A01

Experiments on and calculation methods for flow in straight noncircular ducts involving turbulence-driven secondary motion are reviewed. The origin of the secondary motion is discussed. A model in which algebraic expressions are derived for the Reynolds stresses in the momentum equations for the secondary motion is introduced. A simple eddy-viscosity model is used for the shear stresses in the longitudinal momentum equation. The kinetic energy and the dissipation rate of the turbulent motion appearing in the algebraic and the eddy-viscosity expressions are determined from transport equations. The resulting set of equations is solved with a marching-forward numerical procedure for three dimensional shear layers. The model is tested by application to developing flow in a square duct and to developed flow in a partially roughened rectangular duct. The main features of the mean of flow and the turbulence quantities are simulated realistically, but the model underpredicts the secondary velocity. Author (ESA)

N83-27179# Bonn Univ. (West Germany). Sonderforschungsbereich 72.
FINITE ELEMENT APPROXIMATION OF THE NONSTATIONARY NAVIER-STOKES PROBLEM. PART 2: STABILITY OF SOLUTIONS AND ERROR ESTIMATES UNIFORM IN TIME
John G. Heywood (British Columbia Univ., Canada) and Rolf Rannacher (Erlangen-Nuernberg Univ., West Germany) Dec. 1982 101 p refs Submitted for publication; sponsored by Deutsche Forschungsgeimschaft
(Grant NRC-A-4150)
(Preprint-558-Pt-2) Avail: NTIS HC A06/MF A01

A finite element method approach using a stability theory for the solution of the general nonstationary Navier-Stokes equations based entirely on energy methods is presented. Solution stability assumptions are introduced in order to extend results local in time to ones which are global. If the solution of the initial boundary value problem is stable, then the error in its discrete approximation remains small uniformly in time. From the stability of a discrete solution, for a single sufficiently small choice of the mesh size, the global existence of a closely neighboring smooth solution can be inferred. Author (ESA)

N83-27180# Imperial Coll. of Science and Technology, London (England). Computational Fluid Dynamics Unit.
TURBULENCE MODELS; A LECTURE COURSE
D. Brian Spalding Jan. 1983 199 p refs
(CFD/82/4-Rev) Avail: NTIS HC A09/MF A01

Entrainment models of turbulence are introduced. Mixing length models for bounded and unbounded flow, and for wall flow are summarized. Effective viscosity models are treated. Transport of scalar quantities is considered. The Prandtl energy model and the k-w, k-k, and k-epsilon turbulence models are outlined. Concentration fluctuations and physically controlled chemical reactions are mentioned. Author (ESA)

N83-27181# Imperial Coll. of Science and Technology, London (England). Computational Fluid Dynamics Unit.
APPLICATION OF A NEW VERSION OF THE k-W MODEL OF TURBULENCE TO EQUILIBRIUM BOUNDARY LAYER FLOW OVER A FLAT PLATE WITH: (1) INTENSE HEAT TRANSFER AND (2) STREAMWISE ADVERSE PRESSURE GRADIENTS
J. O. Ilegbusi and D. B. Spalding Nov. 1982 26 p refs

(CFD/82/14) Avail: NTIS HC A03/MF A01

Wall functions needed to account for heat transfer and pressure gradients in a k-W turbulent flow model are outlined and the model is applied to flow over a flat plate. The effect of the laminar sublayer in resisting heat transfer is taken as obeying the Jayatillaka correlation. The effect of pressure gradients on the log-law wall-function is accounted for as in the GENMIX computer code. A grid expanding with the boundary layer thickness is employed in each case. The model performs as well as the original version, and does not need the near-wall fix of the latter.

Author (ESA)

N83-27182# Imperial Coll. of Science and Technology, London (England). Computational Fluid Dynamics Unit.

APPLICATION OF A NEW VERSION OF THE k-W MODEL OF TURBULENCE TO A BOUNDARY LAYER WITH MASS TRANSFER

J. O. Ilegbusi and D. Brian Spalding Nov. 1982 19 p refs (CFD/82/15) Avail: NTIS HC A02/MF A01

The prediction of heat transfer from a porous flat plate with a range of blowing and suction through the surface using a k-W turbulence model is described. The effects of mass transfer on the law of the wall are taken as obeying the Jayatillaka correlation. Agreement between predicted and measured variations with the length Reynolds number of the Stanton number is satisfactory even at strong suction rates, as a result of the use of sublayer resistance factor which ensures that the asymptotic limit is approached for these cases. For strong blowing results, the Stanton number limit is zero and its behavior is adequately predicted.

Author (ESA)

N83-27183# Rolls-Royce Ltd., Derby (England).

CALCULATION OF THE UNSTEADY FLOW THROUGH RELATIVELY MOVING BLADE ROWS AND THE UNSTEADY BLADE FORCES

W. Lienhart 5 Mar. 1982 16 p ref Transl. into ENGLISH of Rept. VDI-193 Munich, 1973 p 75-79 In ENGLISH and GERMAN

(PNR-90158; Trans-16108/TLT-00871) Avail: NTIS HC A02/MF A01

The fluctuations in blade force produced by the relative motion of the stationary and rotating rows of an axial turbine, (nozzle excitation), are calculated for frictionless incompressible flow with a surface-singularity method. This takes account of the vortex wakes of both rows and the variation of their paths with time. Results for a two row configuration with axial inlet flow and near axial outlet flow are shown. Author (ESA)

N83-26788# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.

ELECTROFLUID DYNAMICS: THE ROLE OF HANS VON OHAIN Final Report

Frank Wattendorf *In its* A Collection of Papers in the Aerospace Sci. Jun. 1982 p 68-82 refs (For primary document see N83-26787 16-01)

Avail: NTIS HC A99/MF A01 CSCL 20/4

N83-26789# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.

THE ENERGY BALANCE IN AXISYMMETRIC STEADY COMPRESSIBLE SWIRL FLOWS WITH CLOSED STREAMLINES Final Report

K. G. Guderley *In its* A Collection of Papers in the Aerospace Sci. Jun. 1982 p 116-136 ref (For primary document see N83-26787 16-01)

Avail: NTIS HC A99/MF A01 CSCL 20/4

N83-26790# Pratt and Whitney Aircraft, East Hartford, Conn. Dept. of Analytical Engineering.

COMPOUND-COMPRESSIBLE NOZZLE FLOW Final Report

A. Bernstein, C. Hevenor, and W. H. Heiser (General Electric Co.) *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 137-144 refs (For primary document see N83-26787 16-01)

Avail: NTIS HC A99/MF A01 CSCL 20/4

N83-26793# Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio.

THE NUMERICAL SOLUTION OF PRESSURE OSCILLATIONS IN AN OPEN CAVITY Final Report

W. L. Hankey and J. S. Shang *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 208-242 refs (For primary document see N83-26787 16-01)

Avail: NTIS HC A99/MF A01 CSCL 20/4

N83-26796# Maryland Univ., College Park. Dept. of Aerospace Engineering.

COMPUTATIONAL FLUID DYNAMICS: AN ENGINEERING TOOL? Final Report

John D. Anderson, Jr. *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 325-336 refs (For primary document see N83-26787 16-01)

Avail: NTIS HC A99/MF A01 CSCL 20D

N83-26800# Indian Inst. of Science, Bangalore.

ON THE LARGE SCALE STRUCTURE OF TURBULENCE IN BOUNDARY LAYER AND SHEAR FLOWS

M. A. Badri Narayanan *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 395-415 refs (For primary document see N83-26787 16-01)

Avail: NTIS HC A99/MF A01 CSCL 20/4

N83-26801# Aerospace Research Labs., Wright-Patterson AFB, Ohio.

IMPROVED ANALYTICAL AND NUMERICAL TECHNIQUES FOR CALCULATING EXPLOSIONS AND IMPLOSIONS Final Report

John W. Goresh and Henry E. Fettis *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 416-447 refs (For primary document see N83-26787 16-01)

Avail: NTIS HC A99/MF A01 CSCL 20/4

N83-26802# Florida Univ., Gainesville. Dept. of Engineering Sciences.

ON SYNGE'S CRITERION FOR THE STABILITY OF PLANE COUETTE FLOW Final Report

K. F. Lee and Knox Millsaps *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 448-455 (For primary document see N83-26787 16-01)

Avail: NTIS HC A99/MF A01

N83-26804# Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio.

HIGHLIGHTS OF AN EJECTOR ANALYSIS Final Report

Siegfried Hasinger *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 478-488 refs (For primary document see N83-26787 16-01)

Avail: NTIS HC A99/MF A01 CSCL 20/4

N83-26805# Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio.

ADVANCES IN EJECTOR TECHNOLOGY: A TRIBUTE TO HANS VON OHAIN'S VISION Final Report

K. S. Nagaraja *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 489-517 refs (For primary document see N83-26787 16-01)

Avail: NTIS HC A99/MF A01 CSCL 20/4

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources.* For related information see also *06 Aircraft Instrumentation,* and *19 Spacecraft Instrumentation.*

N83-27184* National Aeronautics and Space Administration. Pasadena Office, Calif.

PARTICLE ANALYZING METHOD AND APPARATUS Patent

Mahedeva P. Sinha (JPL, California Inst. of Tech., Pasadena), Charles E. Griffin (JPL, California Inst. of Tech., Pasadena), David D. Norris (JPL, California Inst. of Tech. Pasadena), and Sheldon K. Friedlander, inventors (to NASA) (JPL, California Inst. of Tech., Pasadena) Issued 17 Nov. 1980 5 p Filed 17 Nov. 1980 Supersedes N83-18089 (21 - 08, p 1218) Sponsored by NASA (NASA-Case-NPO-15292-1; US-Patent-4,383,171; US-Patent-Appl-SN-207135; US-Patent-Class-250-282; US-Patent-Class-250-288; US-Patent-Class-250-423) Avail: US Patent and Trademark Office CSCL 14B

The rapid chemical analysis of particles in aerosols can be accomplished using an apparatus which produces a controlled stream of individual particles from an environment, and another apparatus which vaporizes and ionizes the particles moving in free flight, for analysis by a mass spectrometer. The device for producing the stream of particles includes a capillary tube through which the air with suspended particles moves, a skimmer with a small opening spaced from an end of the capillary tube to receive particles passing through the tube, and a vacuum pump which removes air from between the tube and skimmer and creates an inflow of air and particles through the tube. The particles passing through the skimmer opening can be simultaneously vaporized and ionized while in free flight, by a laser beam of sufficient intensity that is directed across the path of the free flying particles.

Official Gazette of the U.S. Patent and Trademark Office

N83-27185# Hughes Research Labs., Malibu, Calif. Atomic Clocks Sect.

NUCLEAR MAGNETIC RESONANCE GYROSCOPE Final Technical Report, 1 Feb. 1980 - 31 May 1982

David M. Pepper and Harry T. M. Wang Dec. 1982 74 p refs (Contract F49620-80-C-0046; AF Proj. 2301) (AD-A124925; AFOSR-83-0023TR) Avail: NTIS HC A04/MF A01 CSCL 17/7

A study of the physics of a nuclear magnetic resonance gyroscope is described. Experimental results in nuclear polarization and relaxation in 3He are obtained using an optical pumping apparatus and a high resolution RF spectroscopic technique. Polarization in the metastable states of the heavy noble gases (20, 21 Ne, 129, 132 Xe) was observed using a similar optical pumping apparatus. A sensitive detection method based on optical polarization of an excited state transition is developed and compared with the conventional method of monitoring optical transmission through the optical pumping cell. A new concept for the optical pumping of odd-mass-numbered heavy noble was isotopes to provide for ground-state nuclear polarization is discussed. Significant polarization in excited state neon was observed via collisional transfer from optically pumped helium in a cell filled with a mixture of helium and neon isotopes. The measured polarization was essentially independent of the isotopic composition. Author (GRA)

N83-27186# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.

MATHEMATICAL MODELING OF BLACK-AND-WHITE CHROMOGENIC IMAGE STABILITY Ph.D. Thesis

Charles Philip Datema Oct. 1982 90 p refs (AD-A125248; AFIT-CI-NR-82-66T) Avail: NTIS HC A05/MF A01 CSCL 14/5

Agfapan Vario-XL film was faded at various levels of temperature, humidity, light, and fade time to determine the mathematical relationships of these variables and to examine whether interaction occurs between each factor. Light stability of the film was measured, and the Arrhenius relationship was used to predict dark stability at ambient storage conditions. It was found that the amount of fade, as measured as either a change in transmittance or density, could be mathematically modeled with a high degree of correlation. Each independent variable (temperature, humidity, and time) was interactive with the other two variables. Under the specific conditions tested, a significant interaction existed between light and dark fading reactions. For example, both the light and dark cyan dye reactions inhibit each other. However, in the case of the magenta and yellow dyes, a synergistic, or catalytic, effect occurs when light fading precedes dark fading. Agfapan Vario-XL is extremely light stable when irradiated by a conventional enlarger light source. The dark stability compares with some of the least stable chromogenic print films -- a 10% loss in printing density is predicted by Arrhenius extrapolation when the Agfapan Vario-XL is stored at room temperature at 45% relative humidity for five years. GRA

N83-27187# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

INFORMATION THEORETIC DETECTION OF OBJECTS EMBEDDED IN CLUTTERED AERIAL SCENES Ph.D. Thesis

Frank Davis Tiller Jul. 1982 191 p refs (AD-A124975; AFIT/DS/EE/82-1) Avail: NTIS HC A09/MF A01 CSCL 14/5

This dissertation presents the theoretical development and numerical implementation of a minimum cross-entropy target detection algorithm. The procedure is based on the solution of a nonlinear constrained cross-entropy minimization problem and requires information in the form of raw image moments. The detection rule involves both preprocessing and real-time computations. The preprocessing requires the selection of a set of target templates and the solution of the constrained cross-entropy minimization problem for the selected target templates. The real-time processing requires the computation of image moments and a set of dot product operations. An orthonormal set of information functions is developed and numerical methods of converting raw image moments into the expected values of the information functions are given. Numerical techniques for image moment computation and a solution scheme for the nonlinear set of constraints are developed and implemented. The procedure is applied to a test set of 100 images and the detection algorithm error probability is projected and related to the salient performance determining factors. GRA

N83-27188# New Hampshire Univ., Durham. Dept. of Civil Engineering.

BEHAVIOR OF A RIGID INCLUSION STRESSMETER IN AN ANISOTROPIC FIELD

G. W. Jaworski, B. C. Dorwart (Goldberg-Zoino and Associates, Inc., Newton Upper Falls, Mass.), W. F. White (Rockwell International Corp., Richland, Wash.), and W. R. Beloff (Goldberg-Ziono and Associates, Inc., Newton Upper Falls, Mass.) Aug. 1982 10 p refs Presented at the 23rd US Symp. on Rock Mech., Berkeley, Calif., 25-27 Aug. 1982 (Contract DE-AC06-77RL-01030) (DE82-016063; RHO-BW-SA-208P; CONF-820803-11) Avail: NTIS HC A02/MF A01

The rigid inclusion stressmeter is an instrument designed to measure variations of the in situ stress around a borehole. It consists of a stiff hollow steel gage body that is preloaded across a borehole diameter. Changes in the situ stress result in slight deformations of the gage body that affect the stress in a highly tensioned wire in line with the rock contact surfaces. Stress changes in the wire are monitored with electronics that measure its natural frequency. To study the behavior of a stressmeter in anisotropic stress fields, a number of linear elastic, finite element analyses were performed where the efects of anisotropic stress changes, elastic properties of the rock-mass and preload stress settings could be investigated. The calibration program consists

of two parts. The first involves subjecting basalt and aluminum cylinders containing stressmeters to changes of stress equal in all directions and normal to the axis of the cylinders. The second part involves setting a stressmeter in an aluminum slat that is subjected to a one-dimensional stress change. DOE

N83-27189# Sandia Labs., Tonopah, Nev. Test Measurement Div.
DETERMINING LIGHT INTENSITY FOR USE WITH INTERMITTENT OR ROTATING PRISM CAMERAS UTILIZING A CINEMATOGRAPHIC LIGHT-INTENSITY TRANSLATOR
Arthur A. Rodriguez 1982 7 p Presented at the 26th Tech. Symp. and Exhibition of the Intern. Soc. for Opt. Eng., San Diego, Calif., 21 Aug. 1982
(Contract DE-AC04-76DP-00789)
(DE82-015414; SAND-82-1065C; CONF-820822-1) Avail: NTIS HC A02/MF A01

A problem at test ranges is the acquisition of valid light intensity measurements at remote camera tracking or fixed camera sites. After all instrumentation is set up and ready to go, one of the last things to be done is to determine what f/stops and shutter settings should be used. Known factors always exist, such as type of camera (intermittent or rotating prism), and type of film in use. Assuming the operator has no automatic exposure control, he now has to measure the ambient light. The operator may use his light meter to take a reading, or it was forgotten, misplaced, or dropped, out of calibration, or have weak or no batteries. Or worse, he may use the light meter incorrectly. Use of the Cinematographic Light Intensity Translator eliminates the inconsistencies of range light measurements. DOE

N83-27190# California Univ., Berkeley. Lawrence Berkeley Lab. Nuclear Science Div.
HEAVY-ION-SPECTROMETER SYSTEM
May 1982 23 p refs
(Contracts DE-AC03-76SF-00098; W-7405-eng-48)
(DE82-017049; LBL-PUB-3019) Avail: NTIS HC A02/MF A01

The rules and practices that management deems to be minimally necessary for the safe operations of the heavy ion spectrometer system (HISS) in the Bevatron Experimental Hall (51B) are set forth. DOE

N83-27191# Battelle Columbus Labs., Ohio.
RESEARCH OPTIONS FOR THE DEVELOPMENT OF SENSORS TO MEASURE THE THERMAL STATE OF SOLID STEEL BODIES Final Report
T. A. Gaspar and H. W. Lownie, Jr. May 1982 74 p refs
(Contract DE-AC06-76RL-01830)
(DE83-007253; PNL-4592) Avail: NTIS HC A04/MF A01

The purpose of the study reported here is to assist Battelle's Pacific Northwest Laboratory (PNL) in planning a research and development program to develop temperature sensors for metal and ceramic industries. This study focuses on sensors to measure internal temperatures within bodies of hot steel. A series of literature surveys, interviews, field visits, and meetings with steel-industry organizations was conducted in seeking answers to questions posed by PNL. These questions, with responses, are summarized. DOE

N83-27192# Oak Ridge National Lab., Tenn.
CALORIMETER FOR MEASURING ac MAGNETIC LOSSES IN SMALL SAMPLES
G. S. Canright and R. L. Anderson 1982 9 p refs Presented at the 3d Joint Intermag-Magnetism and Magnetic Mater. Conf., Montreal, 17 Jul. 1982
(Contract W-7405-eng-26)
(DE82-018167; CONF-820727-4) Avail: NTIS HC A02/MF A01

A calorimeter was developed to measure the total core loss in small samples of magnetic materials which are not suited to conventional measurement techniques. The method is similar to the helium boil-off calorimeter used in some cases to measure ac losses in superconductors. Power losses in the sample are determined by measuring the rate of boiling of a fluid in which the sample is immersed. The sample is in open magnetic circuit. Uncertainty of the method is estimated at 3%. DOE

N83-27193# University of Southern California, Marina del Rey. Inst. for Physics and Imaging Science.
PLACE OF HgI2 ENERGY-DISPERSIVE X-RAY DETECTORS
A. J. Dabrowski, G. C. Huth, J. S. Iwanczyk, J. H. Kusmiss, J. S. Barton, J. M. Szymczyk, W. Schnepple, and R. Lynn 1982 41 p Presented at the 5th Intern. Workshop on HgI2 Nucl. Radiation Detectors, Jerusalem, 6 Jun. 1982 Prepared in cooperation with Edgerton, Germeshausen and Grier, Inc., Santa Barbara, Calif.
(Contract DE-AC08-76NV-01183)
(DE82-017651; CONF-820667-6) Avail: NTIS HC A03/MF A01

After a review of solid-state conduction counters, in general, and of the history of mercuric iodide, in particular, the theory of operation of solid-state energy-dispersive HgI2 detectors is discussed. The main factors which limit energy resolution in solid state compound detectors are considered, including statistical fluctuations in charge generation, the window effect, trapping, inhomogeneities in the detector material, and electronic noise. Potential applications of room-temperature HgI2 X-ray fluorescence analysis with HgI2. Directions of current investigations are given. DOE

N83-27194# Stanford Linear Accelerator Center, Calif.
FRACTIONAL CHARGE SEARCH
W. Innes, S. Klein, M. Perl, and J. C. Price Jun. 1982 6 p refs Presented at Am. Phys. Soc. Spring Meeting, Washington, D.C., 26 Apr. 1982
(Contract DE-AC03-76SF-00515)
(DE82-018607; SU-SLAC-Pub-2938; CONF-820457-2) Avail: NTIS HC A02/MF A01

A device to search for fractional charge in matter is described. The sample is coupled to a low-noise amplifier by a periodically varying capacitor and the resulting signal is synchronously detected. The varying capacitor is constructed as a rapidly spinning wheel. Samples of any material in volumes of up to 0.05 ml may be searched in less than an hour. DOE

N83-27195# Sandia Labs., Albuquerque, N. Mex.
CONCENTRATION SOLAR-CELL FLASH TESTER
R. E. Hilbray Apr. 1982 44 p refs
(Contract DE-AC04-76DP-00789)
(DE82-018551; SAND-82-0829) Avail: NTIS HC A03/MF A01

A method is described for testing solar cells at high concentrations in a laboratory environment without the need of coolant loops, precision tracking apparatus or dependence on cloud-free days. A complete Voltage-Current (V-I) characteristic curve for a solar cell is taken during one flash of a Xenon lamp light source. A comparison of this testing apparatus and an existing outside facility has shown this flash technique to be an accurate alternative. DOE

N83-27196# Sandia Labs., Albuquerque, N. Mex. Physical Standards Div.
INTERCOMPARISON OF WATER TRIPLE POINT CELLS AND STANDARD PLATINUM RESISTANCE THERMOMETERS
Robert N. Roberts Dec. 1982 11 p
(Contract DE-AC04-76DP-00789)
(DE83-005971; SAND-82-1899) Avail: NTIS HC A02/MF A01

Four platinum resistance thermometers and four water triple point cells used in the Primary Standards Temperature Laboratory were tested. Analysis of data showed the thermometers to be interchangeable and the cells to be interchangeable, and that any thermometer can be used with any cells. DOE

N83-27197# Sandia Labs., Albuquerque, N. Mex. Photometrics and Optical Development Div.
ANALYSIS OF STREAK-CAMERA MEASUREMENT ERRORS CAUSED BY MISORIENTATION OF THE CAMERA SLIT WITH RECORDING DIRECTION
Eugene A. Igel Dec. 1982 12 p refs
(Contract DE-AC04-76DP-00789)

(DE83-005970; SAND-82-0816) Avail: NTIS HC A02/MF A01

Streak or smear camera records in which the lack of perpendicularity between the camera slit and the recording direction is not considered were analyzed. Generated velocity errors are either constant or variable, depnding upon the orientation strategy used in analyzing the film. The size of the absolute errors is proportional to the slit misorientation angle or to the product of slit misorientation and the square of event velocity. The relative velocity error, expressed as a decimal fraction, is equal to the slit misorientation angle in radians. When the degree of slit misorientation is unknown, film reading strategies are offered for minimizing absolute and elative errors. Slit misorientation also causes symmetrical phenomena to be recorded asymmetrically. Nevertheless, all aberrances can be corrected with a simple function that restores the photographic measurements to their true displacement time values.

DOE

N83-27198# Technical Research Centre of Finland, Espoo. Instrument Lab.

AN INSTRUMENT FOR MEASURING DYNAMIC SURFACE TENSION

Ari Kukkonen, Juha Nummipuro, and Jouko Virtanen Jan. 1983 36 p refs Sponsored by Nordiska Inst. foer Faergforskning, Denmark and Grafiska Forskningslab., Sweden

(VTT-140; ISBN-951-38-1609-5; ISSN-0358-5077) Avail: NTIS HC A03/MF A01

An instrument for measuring the dynamic surface tension of water solutions by the oscillating jet method was constructed. The values of the surface tension as a function of the surface age are calculated by inserting into Bohr's equation the wave parameters, density of the liquid and flow rate of the jet. The jet is formed by a hydrostatic pressure through an elliptical orifice. The cross section of the standing wave in the jet is scanned by an image sensor, from which the results are fed to a microcomputer for computing and display. The reproducibility of the measurement is better than 3 % in the age range 0.8 to 20 msec. Measurements suggest that surface tension is a function of the surface age. Author (ESA)

N83-27199# National Bureau of Standards, Washington, D.C. National Measurement Lab.

CALIBRATION AND RELATED MEASUREMENT SERVICE OF THE NATIONAL BUREAU OF STANDARDS

L. J. Kieffer Oct. 1982 110 p refs

(PB83-151662; NBS-SP-250; LC-63-60099) Avail: NTIS HC A06/MF A01 CSCL 14B

Descriptions of the currently available NBS calibration services special test services and measurement assurance programs are provided. In addition each section describing specific services contains references to additional publications giving more detail about the measurement techniques and proceres used. This revised edition reflects the services available as of the first quarter of 1982. NBS Special Publication 250 was last issued in 1980. The Appendix to SP250 is reissued every 6 months (April and October). GRA

N83-26811# Air Force Aero Propulsion Lab., Wright-Patterson AFB, Ohio.

VIBRATION ANALYSIS OF A SPINNING DISK USING IMAGE DEROTATED HOLOGRAPHIC INTERFEROMETRY Final Report

J. C. MacBain, J. E. Horner, W. A. Stange, and J. S. Ogg (Air Force Aeronautical Systems Div.) *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 642-647 refs (For primary document see N83-26787 16-01)

Avail: NTIS HC A99/MF A01 CSCL 14/5

36 LASERS AND MASERS

Includes parametric amplifiers.

N83-27200*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

A NASA HIGH-POWER SPACE-BASED LASER RESEARCH AND APPLICATIONS PROGRAM

R. J. DeYoung, G. D. Walberg, E. J. Conway, and L. W. Jones May 1983 46 p refs

(NASA-SP-464; NAS 1.21:464; LC-83-600161) Avail: NTIS HC A03/MF A01 CSCL 20E

Applications of high power lasers are discussed which might fulfill the needs of NASA missions, and the technology characteristics of laser research programs are outlined. The status of the NASA programs or lasers, laser receivers, and laser propulsion is discussed, and recommendations are presented for a proposed expanded NASA program in these areas. Program elements that are critical are discussed in detail. S.L.

N83-27201# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Mechanics and Surface Interactions Branch.

GENERAL RELATIONS FOR EXACT AND INEXACT INVOLUTE BODIES OF REVOLUTION Interim Report, Aug. 1981 - Feb. 1982

Nicholas J. Pagano Apr. 1982 44 p refs

(AF Proj. 2307)

(AD-A124849; AFWAL-TR-82-4053) Avail: NTIS HC A03/MF A01 CSCL 20/5

A thorough treatment of the mathematical modeling characterizing various aspects of involute construction geometry is presented in this report. Included in the work are the equations that describe the exact involute approach as well as the so called start-line method which contains certain approximations. New features incorporated include the treatment of interleaf ply patterns, kinematics of debulking, errors caused by the approximations in the start-line approach in terms of discontinuity strains, and explicit (closed form) relations that characterize the hypothetical involute surface in the latter approach. The equations presented also provide a complete description of the involute surface geometric parameters necessary to define the distribution of the elastic stiffness tensor. Author (GRA)

N83-27202# Naval Research Lab., Washington, D. C.

A FREE ELECTRON LASER DRIVEN BY A LONG PULSE INDUCTION LINAC

C. W. Roberson (ONR, Arlington, Va.), J. A. Pasour, F. Mako (JAYCOR, Inc., Alexandria, Va.), R. Lucey (Pulse Sciences, Inc., San Leandro, Calif.), and P. Sprangle 7 Mar. 1983 72 p refs Submitted for publication

(AD-A125221; NRL-MR-5013) Avail: NTIS HC A04/MF A01 CSCL 17/8

An overview of Free Electron Laser (FEL) research is presented, and a high-current, long pulse FEL experiment is described. The overview consists of a description of the FEL mechanism and operating regimes and a historical survey of experimental research. Preliminary results are presented from an FEL experiment using both linear and diffusive magnetic wigglers with a long pulse induction linac (less than or approx. 800 kV, less than or approx. 800 A, 2 microsec). Mode identification of the approx. 100 kW output radiation pulse indicates that both FEL and cyclotron emission is present. Author (GRA)

N83-27203# Wisconsin Univ., Madison. Mathematics Research Center.

THERMOELASTIC RESPONSE TO A SHORT LASER PULSE Technical Summary Report

John C. Strikwerda and Andrew M. Scott Nov. 1982 30 p refs (Contract DAAG29-80-C-0041)

(AD-A125247; MRC-TSR-2451) Avail: NTIS HC A03/MF A01 CSCL 20/5

The authors consider a one-dimensional model of the thermoelastic response to laser heating by a pulse of very short duration. They treat the linear equations of thermoelasticity by perturbation methods using the pulse duration as the perturbation parameter. The perturbation analysis separates the problem into two time regimes, the short time scale, which is of the same order as the pulse duration, and the long time scale, which is much longer than the pulse duration. Convenient analytical expressions are

obtained for the temperature change and displacement in both time regimes. GRA

N83-27204# Raytheon Co., Sudbury, Mass. Electro-Optics Systems Lab.
MODULAR INCOHERENT CO SUB 2 TEA LASERS Final Report, 15 Jul. 1980 - 31 Aug. 1982
J. T. Ganley and A. J. Legere 10 Sep. 1982 56 p refs
(Contract DAAK70-80-C-0090)
(AD-A124960; ER82-4284) Avail: NTIS HC A04/MF A01 CSCL 20/5

Two pulsed 10-micron transmitter systems were designed, fabricated and tested, one for use in cross-wind sensor applications, and one for target designator applications. The goal of the Incoherent TEA laser effort was to make these units capable of the required optical and electrical performance characteristics with total system lifetimes of a few million pulses. Author (GRA)

N83-27205# Cornell Univ., Ithaca, N. Y. Dept. of Material Science.
MELT DEPTH AND REGROWTH KINETICS IN PULSED LASER ANNEALING OF SILICON AND GALLIUM ARSENIDE
G. J. Galvin, Michael O. Thompson, J. W. Mayer, P. S. Peercy (Sandia National Labs., Albuquerque, N. Mex.), and R. B. Hammond (Los Alamos National Lab.) 1983 6 p refs Presented at the SPIE Meeting on Laser Processing of Semiconductor Devices, Los Angeles, Jan. 1983
(Contract DE-AC04-76DP-00789)
(DE83-005192; SAND-82-2986C; CONF-830123-1) Avail: NTIS HC A02/MF A01

High intensity pulsed laser irradiation of semiconductor materials results in ultrafast melting and resolidification of a thin surface layer. An experimental probe was developed based on the discontinuous change in electrical conductivity of a semiconductor material upon melting. Real time monitoring of the dynamics of pulsed laser melting and resolidification is obtained by transient electrical conductance measurements. Melting velocities from 5 to 200 m/s and resolidification velocities of 1 to 20 m/s are observed in silicon with this technique. Simultaneous measurement of the optical reflectance give complementary information on laser melting dynamics. Data from both electrical conductance and optical reflectance measurements are presented for silicon and gallium arsenide. The real time experimental data provide strong evidence for a simple thermal model for melting and resolidification during nanosecond pulsed laser annealing. DOE

N83-27206# KMS Fusion, Inc., Ann Arbor, Mich.
BRILLOUIN BACKSCATTER FROM GAS-JET TARGETS ILLUMINATED BY A MULTI-LINE LASER SOURCE
George E. Busch and Robert L. Maynard 14 Apr. 1982 6 p refs Presented at the CLEOS Conf., Phoenix, Ariz., 14 Apr. 1982
(Contract DE-AC08-78DP-40030)
(DE82-012586; KMSF-U-1190; CONF-820435-1) Avail: NTIS HC A02/MF A01

Rotational Raman scattering of 532 nm, 100 psec pulses in hydrogen produces numerous spectral lines. This multiline source was characterized and used to study predicted reductions in Brillouin scattering from gas jet targets. DOE

N83-27207# Michigan Univ., Ann Arbor. Dept. of Nuclear Engineering.
EXPERIMENTS ON FOCUSING SYSTEMS IN LASER INITIATED DISCHARGE CHANNELS
R. M. Gilgenbach, C. E. Ulrich, L. Horton, and J. Meachum 20 May 1982 21 p refs
(NR Proj. 012-756)
(AD-A125296; TR-106) Avail: NTIS HC A02/MF A01 CSCL 20/5

Experiments have been performed to compare alternative focusing systems for CO2 laser initiation of 30 kV discharge channels in atmospheric pressure air. The three focusing systems included: (1) A single focus by means of a 79 cm focal length lens, (2) A single focus by means of a 250 cm focal length mirror, and (3) Dual foci in which the beam was split and both the 79 cm focal length and the 250 cm focal length systems were employed. Results show that the long chain of breakdown beads from the 250 cm focal length mirror is effective in initiating and guiding channels up to 10 cm in length, compared to about 5.6 cm for the 79 cm focal length lens. The scaling of channel length with laser energy has been measured to be roughly linear for the 250 cm focal length system; comparison has been made with the distance over which laser induced breakdown occurs. Author (GRA)

N83-27208# Mound Lab., Miamisburg, Ohio.
LASER MARKING OF COMPONENT PARTS
Alabert V. Gress, Jr. 1983 9 p Presented at SPIE Meeting on Laser Process. of Semicond. Devices, Los Angeles, 1 Jan. 1983
(Contract DE-AC04-76DP-00053)
(DE83-006728; MLM-3042(OP); CONF-830123-2) Avail: NTIS HC A02/MF A01

Permanent identification of components and subassemblies for traceability and historical purposes is essential for assemblies subject to long term storage. Marketing requirements run the gamut from simple functional alphanumerics for terminal or wire numbers to compiex component identification involving program nomenclature, part number, manufacturer's code, serial number, data code, and lot or batch number. The wide range of opaque materials marked includes both ferrous and nonferrous materials, plastics, composites, and ceramics. DOE

N83-27209# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
INVESTIGATION OF THE DYNAMICS OF ELECTRONICALLY EXCITED STATES AFTER EXCITATION WITH AN EXCIMER LASER Thesis [UNTERSUCHUNG DER DYNAMIK ELEKTRONISCH ANGEREGTER ZUSTAENDE NACH ANREGUNG MIT DEM EXCIMERENLASER]
G. Dornhoefer Nov. 1982 89 p refs In GERMAN
(MPIS-14/1982; ISSN-0436-1199) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 16,35

The dynamics of electronically excited states of gaseous substances were temporally and spectrally resolved. The lines of KrF and ArF excimer lasers were used to selectively populate vibrational states in CF2, respectively CS, and to subsequently study the dynamics of the relaxing molecule. Its fluorescence was spectrally resolved with a monochromator and temporally with a secondary electron multiplier. The CS radical in the ground state is formed by photolysis of CS2. Its excitation function, fluorescence and vibrational disactivation mechanism are obtained. Vibrational disactivation and rotational relaxation mechanisms of CF2 are elucidated. Author (ESA)

N83-27210# Research Inst. of National Defence, Linkoeping (Sweden). Dept. 3.
LASER SAFETY OF AIR BATHYMETRY
Bengt Kleman Jan. 1983 26 p refs In SWEDISH; ENGLISH summary
(FOA-C-30292-E1) Avail: NTIS HC A03/MF A01

Data for permissible irradiation at pulse-repetition green N d YAG radiation are reported. Flight altitude and speed permissible for irradiation at the sea surface are discussed. Safety aspects of laser bathymetry from helicopters or aircraft are treated. The need for the laser operator to have observational control over the part of the sea surface that can be hit by radiation of higher irradiance than the threshold value is stressed. The risks of flights over islands and shores are outlined, as well as the risks for animal life. Author (ESA)

N83-27211# Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. Electronique et Physique.
THE PHASE NOISE OF SEMICONDUCTOR LASERS IN SINGLE MODE OPTICAL FIBER HETERODYNE SYSTEMS Ph.D. Thesis [ETUDE DU BRUIT DE PHASE DES LASERS SEMICONDUCTEURS DANS LES SYSTEMES OPTIQUES HETERODYNES A FIBRE UNIMODALE]

Francisco-Javier Mendieta 17 Dec. 1982 93 p refs In FRENCH
(ENST-E-82013) Avail: NTIS HC A05/MF A01

Heterodyne photodetection and the influence of the laser phase noise on the detector output are analyzed. Models describing the incidence of phase noise on the heterodyne output current in the cases of correlated and noncorrelated waves are discussed. The stabilization procedures for semiconductor lasers are examined, and the incidence of temperature, injection, current and pressure on the average wavelength of a GaALAs laser are detailed. A single mode fiber heterodyne interferometer of a Mach Zender type was used to determine the energy density spectrum. Result show a band width of tens of kHz in the case of a stabilized HeNe Laser, while for a AsALGa semiconductor laser source a spectral band width of 10 MHz/mW is found. Author (ESA)

N83-26799# Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio. Aeronautical Systems Div.
DEGRADATION OF A LASER BEAM BY A TURBULENT JET Final Report
G. F. Cudahy, J. T. VanKuren, and H. E. Wright *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 372-394 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 20/5

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N83-27212 National Maritime Inst., Feltham (England).
OPEN WATER EXPERIMENTS ON AN ROV THRUSTER
I. W. Dand Jul. 1981 48 p refs
(Contract OETB-Proj-3/690; OETB-Proj-252010)
(NMI-R-143) Copyright. Avail: Issuing Activity

In order to provide reference performance data, open water tests were carried out on a drive thruster of a remotely operated underwater vehicle (ROV). The experimental craft is controlled and propelled by four variable-pitch ducted helical thrusters. Results were obtained over a range of propeller blade pitch angles and for positive and negative advance coefficients. The performance of the thruster is compared with that of other marine screw propellers and the negative effect on performance of seaweed guards at duct entry and exit is discussed. While the overall performance is good, it falls short of that which can be obtained from a well designed fixed pitch marine ducted propeller.
Author (ESA)

N83-27213*# Rocketdyne, Canoga Park, Calif.
HYBRID HYDROSTATIC/BALL BEARINGS IN HIGH-SPEED TURBOMACHINERY Final Report, 29 Aug. 1980 - 15 Dec. 1982
Charles E. Nielson Jan. 1983 381 p refs
(Contract NAS3-22480)
(NASA-CR-168124; NAS 126:168124; RI/RD83-104) Avail: NTIS HC A17/MF A01 CSCL 13I

A high speed, high pressure liquid hydrogen turbopump was designed, fabricated, and tested under a previous contract. This design was then modified to incorporate hybrid hydrostatic/ball bearings on both the pump end and turbine end to replace the original conventional ball bearing packages. The design, analysis, turbopump modification, assembly, and testing of the turbopump with hybrid bearings is presented here. Initial design considerations and rotordynamic performance analysis was made to define expected turbopump operating characteristics and are reported. The results of testing the turbopump to speeds of 9215 rad/s (88,000 rpm) using a wide range of hydrostatic bearing supply pressures are presented. The hydrostatic bearing test data and the rotordynamic behavior of the turbopump was closely analyzed and are included in the report. The testing of hybrid hydrostatic/ball bearings on a turbopump to the high speed requirements has indicated the configuration concept is feasible. The program has presented a great deal of information on the technology requirements of integrating the hybrid bearing into high speed turbopump designs for improved bearing life. Author

N83-27214*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ROLLING-ELEMENT BEARINGS
Bernard J. Hamrock and William J. Anderson (Bearings and Lubrication, North Olmsted, Ohio) Jun. 1983 61 p refs Submitted for publication
(NASA-RP-1105; E-1440; NAS 1.61:1105) Avail: NTIS HC A04/MF A01 CSCL 13I

Rolling element bearings are a precision, yet simple, machine element of great utility. A brief history of rolling element bearings is reviewed and the type of rolling element bearings, their geometry and kinematics, as well as the materials they are made from and the manufacturing processes they involve are described. Unloaded and unlubricated rolling element bearings, loaded but unlubricated rolling element bearings and loaded and lubricated rolling element bearings are considered. The recognition and understanding of elastohydrodynamic lubrication covered, represents one of the major development in rolling element bearings. S.L.

N83-27215# Oak Ridge National Lab., Tenn.
INTERNATIONAL CONFERENCE ON WELDING TECHNOLOGY FOR ENERGY APPLICATIONS
S. A. David, comp. and G. M. Slaughter, comp. Sep. 1982 658 p refs Conf. held in Gatlinburg, Tenn., 16-19 May 1982; sponsored by American Welding Society, ORNL and American Society for Metals Joining Div.
(Contract W-7405-eng-26)
(DE83-006404; CONF-820544) Avail: NTIS HC A99/MF A01

Topics concerning welding techniques for application to fossil and nuclear energy technology are addressed. Special emphasis is placed on pressure vessels, heat exchangers, tubing, automation, and materials considerations. For individual titles, see N83-27216 through N83-27240.

N83-27216# Welding Inst., Cambridge (England).
WELDING TECHNOLOGY FOR ENERGY CONVERSION
A. A. Wells *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. Sep. 1982 p 1-16 refs (For primary document see N83-27215 16-37)
Avail: NTIS HC A99/MF A01

Welding technology for pressure and storage vessels, piping, heat and mass transfer equipments, and dynamic parts for pumps, turbines and electric generators is reviewed. Particular emphasis is given to the present development and future prospects of the newer welding processes such as electron beam, friction and diffusion bonding, in comparison with the range of arc fusion processes, together with the joint properties that are obtained. Reference is also made to particular problems such as site construction, repair, remote welding, and heat treatment. M.G.

N83-27217# Stuttgart Univ. (West Germany). Staatliche Materialprufungsanstalt.
MATERIALS AND WELDING PROCESS DEVELOPMENT FOR NUCLEAR APPLICATION IN THE FEDERAL REPUBLIC OF GERMANY
K. Kussmaul, W. Stoppler, and R. Sinz *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. Sep. 1982 p 17-70 (For primary document see N83-27215 16-37)
Avail: NTIS HC A99/MF A01

The concept of basis safety was developed and gradually implemented in the Federal Republic of Germany in order to achieve an utmost availability and exclusion of catastrophic failure of pressure boundary components in light water reactors. This concept provides redundant safeties both for long-term service as well as for an accident by improving toughness properties of the non-influenced base material, heat affected zone (HAZ) and deposited metal of components. The toughness properties and the susceptibility to cracking can be decisively influenced by a

well balanced chemical composition at very low sulphur contents, melting, forming, and heat treatment techniques. With the help of a welding simulation technique it was possible to systematically investigate and to prove, e.g., in fine-grained structural steels, the toughness properties in the HAZ as a function of the stress-relief temperature. Submerged-arc welding (SAW) on heavy section components were intensively investigated during and after welding. This helped to shed light on the microstructural development of the HAZ and beads as a function of the particular parameters of the welding process. Toughness, corrosion, and weldability properties of various stainless steels were also examined. M.G.

N83-27218# Massachusetts Inst. of Tech., Cambridge.
WELDING TECHNOLOGIES AND MATERIALS FOR ENERGY APPLICATIONS IN JAPAN
I. Masumoto (Nagoya Univ.), K. Masubuchi, and T. Fujimura (Technical Research Association) *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. Sep. 1982 p 71-90 refs (For primary document see N83-27215 16-37)
Avail: NTIS HC A99/MF A01

The development of materials for energy applications is discussed, particularly high quality steels for nuclear power plants, hastelloy for structural components at extra-high temperature service, and materials for corrosion resistant pipes. Welding processes, including electron beam welding, narrow gap arc welding, and laser and diffusion welding, are also addressed. Finally, the construction of a liquefied natural gas storage tank is described. M.G.

N83-27219# Hydro-Electric Power Commission, Toronto (Ontario). Thermal Generation Div.
WELDING PRACTICES IN FOSSIL-FIRED UNITS
G. G. Stephenson *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. Sep. 1982 p 105-117 refs (For primary document see N83-27215 16-37)
Avail: NTIS HC A99/MF A01

Welding plays a vital role in the design, construction, and repair of fossil-fired equipment. Maintenance repairs which are made to original welds and how modified welding procedures were developed for field applications are addressed. Qualification of welding procedures and welders are discussed. Shielded metallic arc and gas tungsten arc welding processes are mainly used to join a wide range of materials, from carbon to low alloy creep resisting steels to stainless steels. Examples are given of repair techniques used for various components. Pulverizer rolls are refurbished using a hardsurfacing build-up. Repairs to boiler drums and headers, using a modified temper bead technique, are also discussed. Ontario Hydro's current practice in evaluating and replacing transition welds between low alloy chrome-molybdenum and a austenitic stainless steels using Inconel filler materials in the shop are detailed. Strategy involved in repairing cracks detected in chrome-molybdenum-vanadium steel turbine valve chests and turbine blade lacing wire is another common occurrence. Precautions to avoid hard spots developing during brazing are described. M.G.

N83-27220# Nooter Corp., St. Louis, Mo.
PROCESSES QUALITY ASSURANCE AND EXAMINATION OF WELD METAL OVERLAYS
John J. Meyer *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. Sep. 1982 p 119-126 refs (For primary document see N83-27215 16-37)
Avail: NTIS HC A99/MF A01

The use of corrosion resistant weld metal to overlay carbon and low alloy steels in pressure vessels is addressed. These overlays are done with a wide variety of processes and overlay materials to rigid standards and high levels of quality. An overview of the processes currently being complexed, the quality level being specified, and the examination of the product is given. M.G.

N83-27221# Cabot Corp., Kokomo, Ind.
HARDFACING MATERIALS AND PROCESSES FOR VALVE APPLICATIONS
S. J. Matthews and P. Crooks *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. Sep. 1982 p 127-138 refs (For primary document see N83-27215 16-37)
Avail: NTIS HC A99/MF A01

Hardfacing as a wear reduction technique for valve components is addressed. Hardfacing is a term describing the application of a hard material to the surface of a component by weld overlay surfacing. Some hardfacing materials and processes are reviewed. Three processes which are used extensively for hardfacing valve components, oxyacetylene, gas tungsten arc, and plasma transferred arc are emphasized. M.G.

N83-27222# Hydro-Quebec Inst. for Research, Varennes.
WELD PENETRATION VARIATION IN GTA WELDING OF SOME 304 L STAINLESS STEELS
J. L. Fihey and R. Simoneau *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. Sep. 1982 p 139-154 refs (For primary document see N83-27215 16-37)
Avail: NTIS HC A99/MF A01

The effect of sulphur and oxygen content in the base metal and oxygen content of the shielding gas upon 304 L stainless steel weldability is analyzed. The mechanism of weld deviation is brought to light through metallographic examination of the welds cross-section and visual and cinephotographic observation of the weld pool. It is suggested that the anodic spot size and its position are responsible for the change in penetration profile of gas tungsten arc welds. M.G.

N83-27223# Nippon Steel Corp., Kawasaki (Japan). Fundamental Research Lab.
HIGH TEMPERATURE PROPERTIES OF THE SEAM WELD PORTION IN 1% Cr-0.5% Mo ERW BOILER TUBING AFTER LONG-TERM AGING
T. Nakazawa, Y. Hosoi, H. Shimada, H. Komatsu, T. Fujii, and H. Nogata *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. Sep. 1982 p 217-229 refs (For primary document see N83-27215 16-37)
Avail: NTIS HC A99/MF A01

Reliability of the seam weld portion of 1% Cr-0.5% Mo ERW (electric resistance welding) boiler tubings for high temperature use was evaluated. High temperature properties of materials aged in the temperature between 500 and 6000C for 5000 h were evaluated by a slow extension rate test (SERT) and a low cycle fatigue test at high temperatures. Microscopic observation was also made with a scanning electron microscope and a transmission electron microscope. Proof stress and tensile strength obtained by SERT tend to decrease with an increase in aging temperature. It is confirmed that the strength of the seam weld portion is higher than that of the base metal. The fatigue crack propagation rates studied by test pieces with a side-notch either at the base metal or at the seam weld portion were found to be lower at the seam weld portion compared with that at the base metal. Dislocations of high density and fine precipitates of carbides were observed with electron microscopy in the seam weld portion. It is also found that the size of dislocation cells formed during fatigue is smaller in the seam weld portion than in the base metal. It is concluded that higher strength of the seam weld portion is closely related to the above mentioned microstructure originated in the dissolution of carbides during ERW process. DOE

N83-27224# Cincinnati Univ., Ohio. Dept. of Materials Science and Metallurgical Engineering.
SUBSTRUCTURE OF A 16-8-2 GTA WELD AS OBSERVED THROUGH TEM
J. R. Foulds and J. Moteff *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. Sep. 1982 p 231-254 refs (For primary document see N83-27215 16-37)
Avail: NTIS HC A99/MF A01

A weldment section from formed and welded large diameter (0.91m OD) thin wall (12.7mm) 316 stainless steel pipe for structural use in the hot-leg of the liquid-metal fast breeder reactor is characterized microstructurally through electron microscopy. The weldment (welded with 16-8-2 filler) examined is sectioned from

pipe in the as-received (formed plus welded plus annealed plus straightened) and the reannealed (formed plus welded plus annealed plus straightened plus reannealed) condition. It is shown that the weld and parent metal exhibit distinctly different elevated temperature recovery characteristics. The substructure size and subboundary energy or misorientation are shown to be effected by variations in the weld heat-input rate. Subboundary analyses indicate the build-up or polygonization occurs on interdendritic growth dislocations accommodating the mismatch between adjacently growing dendrites. R.J.F.

N83-27225# Central Electricity Generating Board, Southampton (England). Engineering Labs.

CREEP DEFORMATION AND CRACK GROWTH IN A LOW ALLOY STEEL WELDED PRESSURE VESSEL CONTAINING DEFECTS

M. C. Coleman *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. Sep. 1982 p 255-280 refs (For primary document see N83-27215 16-37)

Avail: NTIS HC A99/MF A01

A full size pressure vessel was constructed to examine the effects of welding residual stresses on the creep deformation and crack growth occurring in heavy section low alloy steel weldments. The vessel was based on Cr/Mo/V main steam pipe and contained four 2-CrMo manual metal arc welds, two in the as-welded condition and two stress relieved for 3 hrs at plus 700 deg C. All the welds contained pre-existing defects machined in the heat affected zones. Results are presented for the continuous creep deformation observed in both the hoop and axial directions of the welds throughout the 11,400 h of testing, as well as the intermittent strain data obtained during inspections. In addition, crack growth observations are described based on the non-destructive examination results. The residual stresses measured are also given for both the as-welded and stress relieved weldments. R.J.F.

N83-27226# Massachusetts Inst. of Tech., Cambridge. Lab. for Manufacturing and Productivity.

IMPROVEMENT OF FUSION WELDING THROUGH MODELLING, MEASUREMENT AND REAL-TIME CONTROL

Koichi Masubuchi, David E. Hardt, Henry M. Paynter, William Unkel, Jose Converti, and Miriam Zacksenhouse *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. Sep. 1982 p 281-300 refs (For primary document see N83-27215 16-37)

Avail: NTIS HC A99/MF A01

The motivation for and the initial results of a research effort to introduce in-process sensing and control to welding operations are described. The intelligent welding machine is differentiated from a mere mechanized or pre-programmed welder in that it controls the quality of the weld directly rather than simply maintaining the welding parameters within specified limits of the values based upon experience or upon trial welds. Initial efforts were concentrated on the fundamentals of static and dynamic characteristics of the welding are, in particular those aspects that are important in determining the stability of the arc to disturbances and the interactions between the arc and the molten pool. Efforts to use measurements of the mechanical impedance of the weld pool to define the weld pool cross sectional shape, as well as experiments with a rudimentary controller design for this purpose are described. R.J.F.

N83-27227# Merrick Engineering, Inc., Nashville, Tenn.

ROBOTICS IN WELDING

John R. Dwyer *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. Sep. 1982 p 302-312 (For primary document see N83-27215 16-37)

Avail: NTIS HC A99/MF A01

The use of industrial robots is discussed. The advantages of robots over human workers is emphasized. Recommendations are given to ensure minimum worker resistance to the introduction of robots. Diagrams and photographs of a typical connection between a robot and a welding system are given. R.J.F.

N83-27228# Naval Research Lab., Washington, D. C. Material Science and Technology Div.

LASER WELDING OF STRUCTURAL ALLOYS

E. A. Metzbower, D. W. Moon, and F. W. Fraser *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. Sep. 1982 p 313-330 refs (For primary document see N83-27215 16-37)

Avail: NTIS HC A99/MF A01

The process of laser beam welding is explained. The mechanical properties and fracture toughnesses of some structural alloys (steels, aluminum and titanium) are discussed. The microstructures of the fusion and heat-affected zones to the base plate are compared. A description of the laser power/welding speed and its variation on plasma suppression is given. For all of the alloys except aluminum, the mechanical properties corresponded to the base plate properties. In the case of aluminum, the weldments fractured in the fusion zone with a degradation of the plate properties. The requirements of a bend test were satisfied by the weldments. Hardness traverses were made across the base plate, heat affected and fusion zones. Microstructures were determined in the three zones and correlated with the mechanical properties and hardnesses. Fusion zone purification was observed in certain alloys. R.J.F.

N83-27229# Nippon Kokan K. K., Kawasaki (Japan). Technical Research Center.

ELECTRON BEAM WELDING FOR HEAVY SECTION STEEL PLATES

J. Tanaka, S. Kosuge, and H. Furukawa *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. Sep. 1982 p 331-343 refs (For primary document see N83-27215 16-37)

Avail: NTIS HC A99/MF A01

A study was made of the selection of electron beam (EB) welding procedures to obtain sound welds and the EB welded joint properties for heavy section steel plates. The EB machine used has a capacity of 75 kW (150 kV x 500 mA). The materials examined are carbon steel (ASTM A516 Gr.70) and 2.250Cr-1Mo steel (ASTM A387 Gr.22 Cl2) with thickness in the range 50-200mm. Porosity and solidification crack were identified as the two major defects likely to occur in EB welds of thicker steel plates. These defects are influenced by steel composition and welding procedures. It was found that they depended strongly on the solidification pattern for such steels with low oxygen and nitrogen content as used in this experiment and could be prevented by the selection of welding procedures. Beam oscillation was the effective technique to prevent weld defects. Horizontal position was found to be preferred for welding steel plates more than 100 mm thick and sound welds could be obtained in 200 mm thick steel plates. R.J.F.

N83-27230# Central Electricity Generating Board, Southampton (England). Engineering Labs.

THE WELDING METALLURGY OF SA508 C1 II HEAT AFFECTED ZONES

P. J. Alberry and J. A. Lambert *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. Sep. 1982 p 347-378 refs (For primary document see N83-27215 16-37)

Avail: NTIS HC A99/MF A01

A weld thermal simulation technique was used to investigate the metallurgical response of SA508 class II material during welding. Dynamic Ac1 and Ac3 data, grain growth kinetics and continuous cooling transformation diagrams were measured. The heat affected zone structure, grain size and precipitate distribution are described in terms of the weld thermal cycle experienced and compared with a weld heat affected zone. The as-welded hardness and tempering response of a range of possible heat affected zone structures were established. The tempering effects of various weld thermal cycles are calculated from isothermal tempering data. The likely tempering effects during welding are estimated and compared with the tempering of actual welds during welding and in subsequent conventional post weld heat treatment. R.J.F.

N83-27231# Colorado School of Mines, Golden. Center for Welding Research.

PERFORMANCE OF THE CaF SUB 2-CaO-SIO SUB 2 SYSTEM AS A SUBMERGED ARC WELDING FLUX FOR A NIOBIUM BASED HSLA STEEL

S. Liu, C. B. Dallam, and D. L. Olson *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. Sep. 1982 p 445-466 refs Sponsored in part by the Dept. of the Army (For primary document see N83-27215 16-37)

Avail: NTIS HC A99/MF A01

Using fused reagent grade CaF2-CaO-SiO2 submerged arc welding fluxes, welds were made on a niobium based steel plate. Weld metal oxygen content was correlated to the flux composition and used to interpret the weld metal microstructure, weld bead penetration and arc stability behavior. The nature of the flux-metal reaction associated with the various alloying elements was also investigated. R.J.F.

N83-27232# Kawasaki Steel Corp., Chiba (Japan). Welding Sect.

TOUGHNESS OF SUBMERGED ARC WELD METALS OF CONTROLLED ROLLED Nb BEARING STEEL

Tadamasa Yamaguchi, Atsushi Shiga, Akio Kamada, and Junichiro Tsuboi *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. Sep. 1982 p 467-482 refs (For primary document see N83-27215 16-37)

Avail: NTIS HC A99/MF A01

Single pass and multipass submerged arc weldings of controlled rolled Nb bearing steel plates was carried out. The influence of Nb on the microstructures of single pass weld metal was investigated. Then the effects of such factors as maximum reheating temperature and stress relieving time on the impact toughness of single pass weld metal was examined. Finally the hardness behavior of multipass weld metal was studied in relation to the change of alloy content in each pass. It is found that acicular ferrite, which improves weld metal toughness, is formed only when Ti is contained in weld metal. The toughness and the hardness of reheated weld metals depend on the maximum reheating temperature. When the maximum reheating temperature is 500 C to 700 C, the hardness of single pass weld metal increases and the toughness decreases because of fine Nb- and V- carbnitride precipitation. When the maximum reheating temperature is over 800 C, the hardness and the toughness remain almost unchanged. R.J.F.

N83-27233# Dalmine S.p.A., Milan (Italy). Research Lab.

CREEP CHARACTERISTICS OF BUTT WELDED JOINTS FOR THICK 2 1/4Cr-1Mo PIPEWORK AND PRESSURE VESSELS

G. Cumino and F. Rinaldi *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. Sep. 1982 p 483-508 refs (For primary document see N83-27215 16-37)

Avail: NTIS HC A99/MF A01

Research program aiming to verify the possibility for assessing the creep strength of heavy wall thickness welded joints by separately analyzing different zones of weldments using new type of specimens with rectangular section. Experiments carried out on 80 mm thick 2 1/4Cr-1Mo steel plates and 50 mm thick AISI 316 steel plates. Creep testing with strain measurements at 550 C, in a range of stresses from 133 to 53 N/mm, for times up to 27,000 hours. Statistical treatment of results on times-to-rupture, % elongation and particularly on times-to-a-given-elongation (0. and 1%). Comparison of the resulting behavior with simulating heat treatments. Example of application of experimentally measured creep parameters for the different zones considered in a suitable mathematical model to predict the inelastic behavior of welded joints. Author

N83-27234# Colorado School of Mines, Golden. Center for Welding Research.

THE INFLUENCE OF FLUX COMPOSITION ON THE CHEMISTRY AND CLEANLINESS OF 2 1/4Cr-1Mo STEEL ELECTROSLAG WELD METAL

J. J. Oldani, R. H. Frost, and G. R. Edwards *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. Sep. 1982 p 509-532 refs (For primary document see N83-27215 16-37)

Avail: NTIS HC A99/MF A01

The chemistry and cleanliness of 2 1/4Cr-1Mo electroslag weld metal have been correlated with the flux composition. Reverse polarity electroslag welds of 2 1/4Cr-1Mo steel were produced without dilution using an oxide based flux in a specially designed crucible. Specific additions of Cr2O3 and MnO were made to the flux, and resulting changes in weld metal chemistry were determined at various heights from the starting tab. Results indicated that the composition of the weld metal was strongly dependent on flux composition, but moved toward steady state concentrations. Electrochemical reactions have been postulated to dominate certain thermochemical equilibria in dc electroslag welding processes. These reactions include: the anodic oxidation of alloy elements such as chromium, manganese, and silicon; oxygen pickup at the anode; and the reduction of metallic cations from the flux at the cathode. The alloy element oxides present in the flux were reduced at the cathode and depleted from the flux. B.W.

N83-27235# Naval Research Lab., Washington, D. C.

EFFECT OF JOINT DESIGN AND FABRICATION LIMITATIONS ON TUBE-TO-TUBESHEET WELDING

Samuel D. Reynolds, Jr. *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. Sep. 1982 p 533-572 refs (For primary document see N83-27215 16-37)

Avail: NTIS HC A99/MF A01

A tube-to-tubesheet (T/TS) weld is discussed. It is the essential part of a system that is designed to form a barrier in a heat exchanger between fluids of different pressures. In some cases, the weld joint additionally provides structural support to the heat exchanger by acting as a stay. As indicated previously in the literature(1), a T/TS weld is not an ASME Code pressure retaining or pressure boundary weld. The engineering requirements for the T/TS welds for the complete service life including startup, emergency shutdown, off line layup and any unusual partial load conditions are discussed. B.W.

N83-27236# Westinghouse Electric Corp., Tampa, Fla. Nuclear Component Div.

WELDING EQUIPMENT AND PROCESS DEVELOPMENT FOR INACCESSIBLE TUBE-TO-TUBESHEET WELDING ON A SODIUM-HEATED STEAM GENERATOR

J. H. Kiefer *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. Sep. 1982 p 573-593 refs (For primary document see N83-27215 16-37)

Avail: NTIS HC A99/MF A01

A unique feature of the Westinghouse steam generator is the reliability afforded by the use of a double-wall tube and also a double tube-to-tubesheet (T/TS) weld barrier between the potentially reactive fluids, sodium and water. Each tube is welded in two places on each end for a total of four T/TS welds per tube. Two of these four are conventional tubesheet face side welds. The other two are termed inaccessible welds because the welding must be done on the tube side of the tubesheet. For a sodium/water reactor to occur, both a face side weld and a tube side weld must fail on the same tube, which makes the event very improbable. The design also includes a leak detection system which will sense and locate a leak at any weld and between the double tube walls. This paper describes the development work performed in connection with the T/TS welding, the challenges associated with this welding because of the unique design of the steam generator, the welding equipment which resulted, and the peripheral equipment that made this specialized welding possible. Author

N83-27237# Central Electricity Research Labs., Leatherhead (England).

CREEP RUPTURE AND CREEP CRACK GROWTH BEHAVIOUR OF TRANSITION JOINTS

B. Nath *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. Sep. 1982 p 597-623 refs (For primary document see N83-27215 16-37)

Avail: NTIS HC A99/MF A01

The creep rupture and creep crack growth behaviors of two commonly used, as welded, transition joints viz. 2 1/4Cr-1Mo/Inconel 182/AISI 316, and 2 1/4Cr-1Mo/AISI 316/AISI 316 have

been studied at 580 C. It has been shown that the dissimilar metal welds are inherently weak in rupture and that the rates of crack growth along interfaces are rapid. Empirical equations defining relationships between stresses and rupture lives of the two joints have been formulated, and can be used to calculate long term rupture strengths. Three different and independent Types of failures have been identified, namely (Type I) interfacial fracture. (Type II) brittle failures, partly along the interface and partly through the HAZ and (Type III) ductile rupture in the ferritic steel. A mechanism for creep deformation of dissimilar metal welds has been put forward to account for the behaviors observed. Roles of various factors, C-denuded zones, mismatch in coefficient of thermal expansions, relative strengths and ductilities of the ferritic steels, the HAZ and the weld metal, the microstructural features of interfaces and the oxidation of the low alloy steel adjacent to interfaces are also discussed. Author

N83-27238# Central Electricity Research Labs., Leatherhead (England). Technical Planning and Research Div.

DAMAGE ACCUMULATION AND FAILURE CRITERIA IN 'CREEP BRITTLE' FERRITIC WELDMENT STRUCTURES

B. J. Cane *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. Sep. 1982 p 623-640 refs (For primary document see N83-27215 16-37)

Avail: NTIS HC A99/MF A01

This paper reports on the critical determining the kinetics of creep cavitation leading to such failures in heat affected zone (HAZ) structures in low alloy ferritic steels. The micromechanisms responsible for cavity formation and growth are briefly described and the predicted cavitation rates are considered in relation to an upper bound approach based on accommodational or constrained kinetic control by the creep response of the material. The upper bound approach is used as the basis of a model to define the stress and stress state dependence of intergranular cavity growth. Multiaxial stress rupture criteria governing rupture life and ductility are developed on this basis. Accordingly a representative rupture stress is proposed which can be applied to uniaxial data to predict the lifetime under a known state of stress. The predictive model is compared with results of uniaxial and multi-axial creep and ruputre tests at 565 C on thermally simulated HAZ structures in 2 1/4CrMo and 1/2CrMoV steels. Application of the model is illustrated for the case of failure analysis of butt-welded tubes and remanent life assessment of welded components by in service inspection. B.W.

N83-27239# General Atomic Co., San Diego, Calif.

DISSIMILAR WELD FAILURE ANALYSIS AND DEVELOPMENT PROGRAM

K. H. Holko and C. C. Li *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. Sep. 1982 p 641-672 refs (For primary document see N83-27215 16-37)

(EPRI Proj. RP-1874)

Avail: NTIS HC A99/MF A01

The problem of dissimilar weld cracking and failure is examined. This problem occurs in boiler superheater and reheater sections as well as main steam piping. Typically, a dissimilar weld joins low-alloy steel tubing such as Fe-2-1/4 Cr - 1 Mo to stainless steel tubing such as 321H and 304H. Cracking and failure occur in the low-alloy steel heat-affected zone very close to the weld interface. The 309 stainless steel filler previously used has been replaced with nickel-base fillers such as Inconel 132, Inconel 182, and Incoweld A. This change has extended the time to cracking and failure, but has not solved the problem. To illustrate and define the problem, the metallography of damaged and failed dissimilar welds is described. Results of mechanical tests of dissimilar welds removed from service are presented, and factors believed to be influential in causing damage and failure are discussed. In addition, the importance of dissimilar weldment service history is demonstrated, and the Dissimilar Weld Failure Analysis and Development Program is described. Author

N83-27240# Huntington Alloys, Inc., W. Va.

SOME OBSERVATIONS ON THE PHYSICAL METALLURGY OF NICKEL ALLOY WELD METALS

C. G. Skillern and A. C. Lingenfelter *In* ORNL Intern. Conf. on Welding Technol. for Energy Appl. Sep. 1982 p 673-685 refs (For primary document see N83-27215 16-37)

Avail: NTIS HC A99/MF A01

Numerous nickel alloys play critical roles in various energy-related applications. Successful use of these alloys is almost always dependent on the availability of acceptable welding methods and welding products. An understanding of the physical metallurgy of these alloys and their weld metals and the interaction of weld metal and base metal is essential to take full advantage of the useful properties of the alloys. To illustrate this point, this paper presents data for two materials: INCONEL alloy 718 and INCONEL Welding Electrode 132. Author

N83-27241# Curtiss-Wright Corp., Wood-Ridge, N.J. Power Systems Div.

HIGH-TEMPERATURE TURBINE-TECHNOLOGY PROGRAM. PHASE 2: TECHNOLOGY TEST AND SUPPORT STUDIES. DESIGN AND DEVELOPMENT OF A REGENERATIVELY FUEL COOLED HIGH TEMPERATURE GAS TURBINE COMBUSTOR FOR OPERATION ON LOW Btu GAS

Jul. 1982 167 p

(Contract DE-AC01-76ET-10348)

(DE83-007342; CW-WR-76-020.104A) Avail: NTIS HC A08/MF A01

The fuel air requirements for low Btu gas combustors result in a paucity of cooling air which results in low Btu gas fueled air cooled combustor designs with annular configurations with complex flow path schemes to maximize cooling efficiency. If the low Btu gas can be utilized as a cooling system medium before it is combusted, conventional multiple can arrangements with simple convection cooled liner can be developed. The design, fabrication and test of a full scale industrial gas turbine burner can with convective cooling of the liner wall by 150 Btu/scf gaseous fuel typical of air blown gasification of coal is described. The 10-in. internal diameter combustor can was successfully operated up to 6 atmospheres pressure, burning 150 Btu/scf gaseous fuel up to 30000F average exit temperature. The fuel cooling effect and combustor exit emissions levels are determined for gas supply temperatures of 150 and 3750 F. The NO/sub x/ emissions levels at the nominal 30000 F combustor exit temperature was substantially below the EPA regulatory level of 75 ppM when adjusted for pressure level effect of 15 atm and 15% oxygen. DOE

N83-27242# Sandia Labs., Albuquerque, N. Mex. TM Advanced Development Div.

SHOCK-HARDENED, HIGH-FREQUENCY, PCM SYSTEM WITH MEMORY FOR EARTH-PENETRATOR-STUDY APPLICATIONS

David E. Barnes 1982 9 p Presented at the Intern. Telemetering Conf., San Diego, Calif., 28 Sep. 1982

(Contract DE-AC04-76DP-00789)

(DE82-017644; SAND-82-1591C; CONF-820920-2) Avail: NTIS HC A02/MF A01

Increasing data requirements for Earth penetrating vehicles have necessitated the design of a new digital telemetry system with greater signal frequency response, higher resolution, and more memory capacity than used previously. The new system encodes data into 8 bit digital words at a rate of 3.2 megabits per second and stores the data into a 640 Kbit CMOS memory for readout after the recovery of the penetrating vehicle. DOE

N83-27243# Oak Ridge National Lab., Tenn.

PNEUMATIC CONVEYING OF COAL AND COAL-LIMESTONE MIXTURES AS APPLIED TO ATMOSPHERIC FLUIDIZED-BED COMBUSTION

C. S. Daw and J. F. Thomas 1982 13 p refs Presented at the 7th Ann. Powder and Bulk Solids Conf., Rosemont, Il. 11 May 1982

(Contract W-7405-eng-26)

(DE82-015694; CONF-820581-1) Avail: NTIS HC A02/MF A01

Pneumatic conveying experiments with coal and coal-limestone mixtures were performed on a conveying system

designed to represent the feed lines in the 20 MW atmospheric fluidized bed combustor. The experimental conditions were chosen to cover the anticipated combustor operating ranges. The results have led to a fundamental understanding of the operating limits associated with coal surface moisture, air velocity, coal and limestone to coal ratio. Coal surface moisture was found to be the most important parameter affecting handling and transport. Specific upper limits for surface moisture were established. It was demonstrated that addition of dry limestone can reduce the conveying problems associated with wet coal. The air velocities causing saltation and surge flow were determined for a variety of conveying conditions. DOE

N83-27244# Aerospace Corp., El Segundo, Calif. Energy Conservation Directorate.
COMBUSTION LOSSES IN AUTOMOTIVE SPARK IGNITION AND DIESEL ENGINES
G. J. Mascetti and W. U. Roessler Aug. 1982 32 p refs
(Contracts DE-AI01-82CS-50286; F04701-81-C-0082)
(DE83-006015; DOE/CS-50286/2) Avail: NTIS HC A03/MF A01

This report quantifies the magnitude of combustion losses occurring in automotive engines due to both incomplete and slow combustion of the air-fuel mixture. The magnitude of these losses serves to define the maximum fuel economy improvement potentially available through use of fuel additives and/or engine modifications intended to improve the combustion process. Incomplete combustion is characterized by the presence of unreacted fuel-derived species in the exhaust. Concentrations of these species are measured on the engine dynamometer for eight spark ignition engines and three diesel engines, and are used to calculate combustion losses. A computer simulation of vehicle operation (VEHSIM Program) is then used to determine losses over the EPA Urban Driving Cycle, which typifies normal driving patterns. Slow combustion converts chemical energy to thermal energy over a range of piston positions, rather than at top dead center. A loss in available work occurs because expansion then takes place for less than the full piston stroke. DOE

N83-27245# Aerospace Corp., El Segundo, Calif. Energy Conservation Directorate.
ASSESSMENT OF WATER ADDITION TO SPARK IGNITION ENGINES
R. R. Covey and J. J. Donnelly, Jr. Sep. 1982 53 p refs
(Contracts DE-AI01-82CS-50286; F04701-81-C-0082)
(DE83-006013; DOE/CS-50286/3) Avail: NTIS HC A04/MF A01

This report presents an assessment of water addition to spark ignition engines based on data available in the open literature and on information obtained through communication with university, industrial, and government personnel. Water addition techniques addressed are (1) manifold injection or carburetion of water-gasoline emulsions, (2) separate induction of water and gasoline, (3) direct cylinder injection of water, (4) manifold water-vapor induction, and (5) water injection into the air intake. Test results show that water addition typically decreases vehicle fuel economy and NO/sub X/emissions, increases HC emissions, and suppresses combustion knock. When accompanied by an engine compression ratio increase and/or advanced spark timing, limited data show that water addition can result in a moderate fuel economy increase at the expense of increased emissions. Unresolved problem areas include phase instability and cost of water-gasoline emulsions, engine corrosion, engine lubricant contamination and deposits, and the need for a freezing point depressant. Water-vapor induction devices (often misnamed as vapor injectors) available in the commercial automotive aftermarket have little or no effect on fuel economy. DOE

N83-27246# Curtiss-Wright Corp., Wood-Ridge, N.J. Power Systems Div.
HIGH-TEMPERATURE-TURBINE-TECHNOLOGY PROGRAM. PHASE 2: TECHNOLOGY TEST AND SUPPORT STUDIES. DESIGN AND DEVELOPMENT OF A HIGH TEMPERATURE LOW EMISSIONS COMBUSTOR FOR STATIONARY GAS TURBINES
Aug. 1982 136 p
(Contract DE-AC01-76ET-10348)
(DE83-005895; CW-WR-76-020.106A; FE-2291-106A) Avail: NTIS HC A07/MF A01

This report describes the design and test evaluation of a high temperature combustor component for an industrial gas turbine for a combined cycle power plant. Specific design considerations include: operation at 26000 F to 30000 C combustor exit (turbine inlet) gas temperature with high combustion efficiency; operation on coal-derived or petroleum distillate fuel; staged combustion for control of emissions; and water-cooled combustor liners for long-term durability. A full size 10-in.-dia gas turbine combustor can utilizing the staged rich-lean burn concept was designed and tested up to an equivalent adiabatic 30000 F turbine inlet temperature with petroleum (JP4) and coal-derived middle distillate (SRC-II) liquid fuels. Fuel-air preparation and injection into the rich burn zone was accomplished by a single liquid fuel-air atomization and mixing tube utilizing a vaporizing reverse flow injection concepts. Combustion efficiencies of 98.7% and 99.4% were determined from measured emissions with each fuel (respectively) at a combustor exit temperature just under 30000 F. DOE

N83-27247# Science Applications, Inc., La Jolla, Calif.
APPLICATION OF NUMERICAL SIMULATION METHODOLOGY TO AUTOMOTIVE COMBUSTION Technical Progress Report
May 1982 61 p
(Contract DE-AC04-79ET-15397)
(DE82-015912; SAI-022-138LJ) Avail: NTIS HC A04/MF A01

A numerical simulation technique for incylinder reactive flows in internal combustion engines was developed. A finite difference based simulation model was developed for time dependent axisymmetric flows which includes: a generalized coordinate system for arbitrary mesh design and treatment of complex and time dependent boundaries; multiple and interacting chemical species; coupled swirl velocity component; and two-equation turbulence closure. In its various stages of development, the model was used to simulate many engine-related problems for validation and demonstration purposes. A droplet evolution model capability was developed to study fuel/air mixing resulting from liquid fuel injection. In addition, various aspects of the turbulent swirling flow modeling capability were examined and improved vis-a-vis available data for realistic engine conditions. Finally, a time dependent valve treatment was developed and used in a study of the evolution of hydrocarbon quench layers during the exhaust stroke. DOE

N83-27743# Nihon Univ., Tokyo (Japan). Atomic Energy Research Inst.
EFFECTS OF RADIAL SUPPORT STEMS ON THE DISK-AND-WASHER STRUCTURE
K. Hayakawa, K. Tsukada, K. Sato, and N. Nakamura *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 80 ref
(For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N83-27248*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
A STUDY OF THE STRESS WAVE FACTOR TECHNIQUE FOR THE CHARACTERIZATION OF COMPOSITE MATERIALS Final Report
Edmund G. Henneke, II, John C. Duke, Jr., Wayne W. Stinchcomb, Anil Govada, and Alan Lemascon Washington Feb. 1983 74 p refs
(Grant NsG-3172)
(NASA-CR-3670; NAS 1.26:3670) Avail: NTIS HC A04/MF A01 CSCL 14D

A testing program was undertaken to provide an independent

investigation and evaluation of the stress wave factor for characterizing the mechanical behavior of composite laminates. Some of the data which was obtained after performing a very large number of tests to determine the reproducibility of the SWF measurement is presented. It was determined that, with some optimizing of experimental parameters, the SWF value can be reproduced to within + or - 10%. Results are also given which show that, after careful calibration procedures, the lowest SWF value along the length of a specimen will correlate very closely to the site of final failure when the specimen is loaded in tension. Finally, using a moire interferometry technique, it was found that local regions having the highest in plane strains under tensile loading also had the lowest SWF values. S.L.

N83-27249# Naval Postgraduate School, Monterey, Calif.
ESTIMATING SURVIVAL PROBABILITY OR RELIABILITY: SIMULATION ASSESSMENTS OF THE DELTA METHOD, JACKNIFE AND BOOTSTRAP M.S. Thesis
Deniz Cora Oct. 1982 65 p refs
(AD-A125000) Avail: NTIS HC A04/MF A01 CSCL 09/2

Three alternative procedures Delta, Jackknife, Bootstrap were investigated and compared for their confidence interval estimation of survival probability of a system. Numerical results from simulations are presented in this report. GRA

N83-27250# Atomic Energy Research Establishment, Harwell (England). Materials Physics Div.
DETECTABILITY OF DEFECTS BY THERMAL NONDESTRUCTIVE TESTING
C. M. Sayers Jan. 1983 21 p refs
(AERE-R-10802; HL83/169(C14)) Avail: NTIS HC A02/MF A01

The detectability of defects by thermal nondestructive testing is examined theoretically. Calculations were performed for heat flow through a material of rectangular cross section assumed to be of infinite length in one direction and containing a linear defect of constant cross section running down its length. The case of an instantaneous temperature rise over an entire surface of the specimen is considered and the relative advantages of one sided and two sided testing are compared. Distortions in the temperature distribution when the defect lies close to an edge of the specimen are studied. Author

N83-26813# Air Force Flight Dynamics Lab., Wright-Patterson AFB, Ohio. Analysis and Optimization Branch.
MTBF CONFIDENCE BOUNDS BASED ON MIL-STD-781C FIXED-LENGTH TEST RESULTS Final Report
H. Leon Harter *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 671-677 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 14/4

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

N83-27251 Defence Research Information Centre, Orpington (England).
RELATIONSHIP BETWEEN STRUCTURE AND IMPACT STRENGTH IN AS-SOLIDIFIED WELDS OF MILD AND LOW ALLOY STEELS
C. Bonnet Dec. 1982 40 p refs Transl. into ENGLISH from Soudage et Tech. Connexes (France), Jul. - Aug. 1980 p 209-230
(BLL-DRIC-T-6775-(3623.66); BR86349) Copyright. Avail: British Library Lending Div., Boston Spa, Engl.

The impact strength of welds are closely related to the chemical composition and structure of the fusion zone. Among the components of the microstructure, the dimensions of the pro-eutectoid ferrite lattice and the proportion of acicular ferrite have fundamental implications for impact strength. The pro-eutectoid lattice, when it exists, materializes the the austenitic grain boundaries. As a result, it is dependent on the high temperature heat cycle. The slower the high temperature heat cycle, the less fine the ferrite lattice and the lower the impact strengths. The increase in the proportion of acicular ferrite is accompanied by an improvement in transition temperatures during impact strength tests, and as a result, for a given cooling program, there is an optimum in the chemical equilibrium due to two contradictiory effects relating to the addition of alloying elements. A.R.H.

N83-27252 Polish Academy of Sciences, Warsaw. Inst. of Fundamental Technological Research.
THE INFLUENCE OF SOME SECOND ORDER EFFECTS ON THE BEHAVIOUR OF RIGID PLASTIC SHELLS AT THE YIELD POINT LOAD
Maria K. Duszek and Francesco Alessandrini (Udine Univ., Italy) 1983 21 p refs
(ISSN-0208-5658) Avail: Issuing Activity

The influence of various definitions of perfectly plastic material associated with the different objective stress rates on the post yield behavior of the shells is considered. The material incompressibility, observed when plastic deformations take place, is also taken into account when formulating geometrical relations. The results are compared with the known solutions obtained under the assumption of constant shell thickness. The problem considered is illustrated by examples of cylindrical shells subject to the end axial forces and uniformly distributed lateral dead load. Author

N83-27253 National Maritime Inst., Feltham (England).
PHASE VARIATION IN WAVE FORCE DATA
H. H. Pearcey Feb. 1982 15 p refs Sponsored by Offshore Energy Technology Board
(NMI-R-132; OT-R-8213) Copyright. Avail: Issuing Activity

Variations of the phase of the maximum water wave force on a structure are discussed. Physical separation of structural members, differences in member diameter, shed vortices and wave randomness are analyzed. A distinction is made in function of the member size (Kenlegan-Carpenter member), for members that are large in diameter relative to wave height. The forces are dominated by inertia effects and the maximum force is in phase with particle acceleration. As members become smaller drag forces are predominant. The phase difference between the maxima of the two cases is 90 deg. The use of the Morison equation to obtain a total force from the combination of drag and inertia forces is illustrated. It is shown that time variation of these forces is very sensitive to small changes from one half cycle to another, suggesting a statistical approach to provide a logical basis for design. Author (ESA)

N83-27254 National Maritime Inst., Feltham (England).
WAVE FORCES ON CIRCULAR CYLINDERS WITH LARGE EXCRESCENCES AT LOW KEULEGAN AND CARPENTER NUMBERS
S. Singh, R. Cash, D. Harris (Lloyd's Register of Shipping), and L. A. Boribond Mar. 1982 72 p refs
(Contract OETB-Proj-580)
(NMI-R-133; OT-R-8209) Copyright. Avail: Issuing Activity

A program to assess the effect of large excrescences on wave loading of circular cylindrical members is presented. This involves the testing in waves of vertical cylinders fitted with rack teeth, and horizontal and vertical cylinders fitted with sacrificial anodes. Results for both forms of excrescences suggest that high loads can be produced under certain conditions (up to four times those on a smooth cylinder, when rack teeth are fitted), notably when the excrescences are at large angles of incidence. Author (ESA)

N83-27255 National Maritime Inst., Feltham (England).
A COMPARISON OF TWO METHODS FOR CALCULATING WAVE DRIFT FORCES

W. J. Brendling Feb. 1982 14 p refs Sponsored by Offshore Energy Technology Board
(NMI-R-137; OT-R-8218) Copyright. Avail: Issuing Activity

Two computer programs used to calculate wave drift forces in offshore structures are compared. The NMIWAVE program, was developed to calculate second order, slowly varying, wave drift forces. It is based on a Stokes series expansion of the wave forces. The first order product terms are evaluated exactly using the results of first order diffraction programs. The second order potential term, however, is only approximated. In the second program, using the techniques of Lagrangean mechanics, computable expressions for the exact second order drift force subject to the rigid lid condition were developed. For freely floating structures with small waterplane areas, which only slightly disturb the surface of long waves, the Lagrangean method represents an advance over the Stokes expansion. For the example considered, an offshore storage terminal, the rigid lid approximation appears to be valid for the first order solution. The comparison of the second order drift forces is somewhat inconclusive, because these forces are dominated by the second order potential which NMIWAVE only approximates. The two methods are probably complementary in the sense that their regimes of validity are almost mutually exclusive. Author (ESA)

N83-27256*# Case Western Reserve Univ., Cleveland, Ohio.
CRACK LAYER MORPHOLOGY AND TOUGHNESS CHARACTERIZATION IN STEELS Final Report
Alexander Chudnovsky and Michael Bessendorf May 1983 41 p refs
(Contract NAG3-223)
(NASA-CR-168154; NAS 1.26:168154) Avail: NTIS HC A03/MF A01 CSCL 20K

Both the macro studies of crack layer propagation are presented. The crack extension resistance parameter R sub 1 based on the morphological study of microdefects is introduced. Experimental study of the history dependent nature of G sub c supports the representation of G sub c as a product of specific enthalpy of damage (material constant) and R sub 1. The latter accounts for the history dependence. The observation of nonmonotonic crack growth under monotonic changes of J as well as statistical features of the critical energy release rate (variance of G sub c) indicate the validity of the proposed damage characterization. S.L.

N83-27257# Canada Inst. for Scientific and Technical Information, Ottawa (Ontario).
THE ANALYSIS OF RESIDUAL STRESSES ACCORDING TO THE PHI PSI XI METHOD WITH DATA COMPENSATION THROUGH ELLIPSES
W. Lode and A. Peiter [1983] 17 p refs Transl. into ENGLISH from Metall (West Germany), v. 30, no. 12, 1976 p 1122-1126
(NRC/CNR-TT-2061) Avail: NTIS HC A02/MF A01

After the grinding of metals, X-ray analyses often show a curved, nonlinear residual deformation distribution over sq sin psi. This is explained by the axes of principal stresses which are inclined in relation to the surface axes of the specimen. As the result the linear distribution branches off into an elliptical distribution. The residual stress is calculated by means of a computer program. The measurements are approximated by means of an elliptical distribution. Deviations are less than 0.01%. S.L.

N83-27258# Canada Inst. for Scientific and Technical Information, Ottawa (Ontario).
NUMERICS OF MEASURING RESIDUAL STRESSES IN NEAR-SURFACE LAYERS BY MEANS OF X-RAY DIFFRACTION ANALYSIS. PART 1: CONSTANT AND INCLINED STRESS DISTRIBUTION
W. Lode and A. Peiter 1983 20 p refs Transl. into ENGLISH from Haerterei-Tech. Mitt. (West Germany), v. 32, no. 5, 1977 p 235-240
(NRC/CNR-TT-2060; ISSN-0077-5606) Avail: NTIS HC A02/MF A01

The numerical methods of an integral technique for calculating the residual stresses shown are discussed and demonstrated in a closed system. Numerical examples are included. Two cases of linear distribution of residual stresses are also discussed. S.L.

N83-27259*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va. Joint Inst. for Advancement of Flight Sciences.
POTENTIAL OF MINICOMPUTER/ARRAY-PROCESSOR SYSTEM FOR NONLINEAR FINITE-ELEMENT ANALYSIS
Gregg A. Strohkorb (George Washington Univ. Hampton, Va.) and Ahmed K. Noor (George Washington Univ., Hampton, Va.) Jun. 1983 71 p refs
(NASA-TM-84566; L-15532; NAS 1.15:84566) Avail: NTIS HC A04/MF A01 CSCL 20K

The potential of using a minicomputer/array-processor system for the efficient solution of large-scale, nonlinear, finite-element problems is studied. A Prime 750 is used as the host computer, and a software simulator residing on the Prime is employed to assess the performance of the Floating Point Systems AP-120B array processor. Major hardware characteristics of the system such as virtual memory and parallel and pipeline processing are reviewed, and the interplay between various hardware components is examined. Effective use of the minicomputer/array-processor system for nonlinear analysis requires the following: (1) proper selection of the computational procedure and the capability to vectorize the numerical algorithms; (2) reduction of input-output operations; and (3) overlapping host and array-processor operations. A detailed discussion is given of techniques to accomplish each of these tasks. Two benchmark problems with 1715 and 3230 degrees of freedom, respectively, are selected to measure the anticipated gain in speed obtained by using the proposed algorithms on the array processor. S.L.

N83-27260# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
ANALYSIS OF PROGRESSIVE COLLAPSE OF COMPLEX STRUCTURES Ph.D. Thesis
Gregory Edward Riggs Dec. 1982 205 p refs
(AD-A125266; AFIT-CI-NR-82-63D) Avail: NTIS HC A10/MF A01 CSCL 12/1

The principal goal of the study was to evaluate an analytical procedure for predicting progressive collapse in damaged complex structures. A structure was modeled for analysis by the finite element method using relatively large, simple elements. There was little or no refinement of mesh size in areas of initial damage or damage propagation. A method was developed for determining and applying allowable stresses to help compensate for the absence of model detail. Stress results of a finite element analysis were examined by a computer post-processor program written for this study to make selective changes to the finite element model. The modified model was analyzed using the finite element method and the procedure was repeated in an iterative fashion to predict progressive collapse. Analytical results were compared to experimental test data to determine the validity of the analytical procedure. The analytical procedure provided a relatively economical method for predicting progressive collapse in a complex structure. Evaluation of a complex structure subjected to three initial damage conditions showed acceptable correlation between experimental and analytical results. The method of determining appropriate allowable stresses was general enough to apply to a wide range of materials and structures. The procedure proved to be an economical estimating tool for predicting residual structural strength. Author (GRA)

N83-27261# California Univ., San Diego, La Jolla. Dept. of Applied Mechanics and Engineering Sciences.
ELONGATIONAL VISCOSITY RHEOLOGICAL PARAMETER STUDY Contractor's Report, Oct. 1979 - Dec. 1981
Stanley Middleman Jun. 1982 71 p refs
(Contract DAAK11-80-C-0001; DA Proj. 1L1-62706-A-553)
(AD-A125265; ARCSL-CR-82020) Avail: NTIS HC A04/MF A01 CSCL 20/11

The physics of drop breakup is considered, and an analysis suggest that the elongational viscosity of the drop may control its

disruption to smaller droplets. An experimental system has been designed which permits the study of the elongational rheology of liquids of interest. In the experiment, the rate of collapse of a gas bubble within the test liquid is measured. Preliminary data are obtained which indicate the feasibility of performing a precise experiment. Features of the experimental system that require improvement are pointed out and discussed. Author (GRA)

N83-27262# Georgia Inst. of Tech., Atlanta. School of Engineering Science and Mechanics.

STABILITY OF LAMINATED COMPOSITE SHELLS SUBJECTED TO UNIFORM AXIAL COMPRESSION AND TORSION Annual Report, 30 Jun. 1981 - 29 Jun. 1982

George J. Simitses, Izhak Sheinman, and Dein Shaw Nov. 1982 171 p refs

(Grant AF-AFOSR-0227-81; AF Proj. 2307)

(AD-A125204; AFOSR-83-0048TR) Avail: NTIS HC A08/MF A01 CSCL 11/4

The governing equations for the nonlinear analysis of imperfect, stiffended, laminated, circular, cylindrical, thin shells, subjected to uniform axial compression and torsion, and supported in various ways, are derived and presented. Two types of formulations have been developed; one (w,F - Formulation) is based Donnell-type nonlinear kinematic relations; and the other (u,v,w, - formulation) is based on Sanders' -type of nonlinear kinematic relations (small strains, moderate rotations about in-plane axes). Author (GRA)

N83-27263# Naval Postgraduate School, Monterey, Calif. Dept. of Mechanical Engineering.

OPTIMIZATION OF THREE DIMENSIONAL COMBINED TRUSS/FRAME STRUCTURES M.S. Thesis

Gregory L. Bender Oct. 1982 99 p refs

(AD-A124988) Avail: NTIS HC A05/MF A01 CSCL 13/13

A finite element code is developed for analysis and design of three dimensional truss and frame structures. Structures are designed for minimum weight subject to constraints on: member stresses, Euler buckling, shell buckling, joint displacements and system natural frequencies. Structures are optimized with respect to member size and structure configuration. The finite element code may be used for analysis only, or may be coupled to an optimizer of the user's choice. The displacement method is used for static analysis, and structure natural frequencies are calculated via the sub-space iteration method. Flexibility is provided for expansion to other than tubular frame elements, and provisions are made for the future growth to panel and other types of structural elements. Documentation is provided to facilitate use of the code. A User's manual is presented with examples and results. An explanation of how this code may be coupled to an optimizer is also provided. Author (GRA)

N83-27264# Argonne National Lab., Ill. Components Technology Div.

FLUIDELASTIC INSTABILITY IN SHELL AND TUBE HEAT EXCHANGERS: A FRAMEWORK FOR A PREDICTION METHOD

M. W. Wambsganss, C. I. Yang, and J. Ralle Dec. 1982 55 p refs

(Contract W-31-109-eng-38)

(DE83-007812; ANL-83-8) Avail: NTIS HC A04/MF A01

A framework for a method to predict fluidelastic instability in heat exchanger tube bundles is presented. The method relies on a three dimensional, cylindrical coordinate, thermal hydraulic analysis code to obtain a representation of the three dimensional flow distribution within the heat exchanger. Local crossflow velocities corresponding to each tube in the exchanger are obtained by interpolation and resultant crossflow velocity distributions are computed and reduced effective crossflow velocities are computed for each tube. The tubes with high values of predicted reduced effective crossflow velocity are the same tubes that first experience fluidelastic instability in the flow tests and vibrate most violently. The simulation correctly predicts that the tubes directly exposed to the flow from the inlet nozzle have a low potential for fluidelastic instability. Agreement is shown in the comparison of the predicted reduced effective crossflow velocities with the critical value obtained from a design guide. The feasibility of developing a heat exchanger tube vibration prediction method, based on a computer simulation of flow distribution, is demonstrated. Such a method has immediate application in design optimization. DOE

N83-27265# California Univ., Livermore. Lawrence Livermore Lab. Engineering Research Div.

ENGINEERING RESEARCH DIVISION PUBLICATION REPORT, CALENDAR YEAR 1981

E. K. Miller and P. L. Livingston 15 Mar. 1982 67 p refs

(Contract W-7405-eng-48)

(DE82-016086; UCID-19080-81) Avail: NTIS HC A04/MF A01

A bibliography, with abstracts, is presented listing all 109 formal publications produced during 1981 by the Engineering Research Division of Lawrence Livermore Laboratory. Author and keyword indexes are provided. DOE

N83-27266# California Univ., Santa Barbara. Dept. of Mechanical and Environmental Engineering.

INFLUENCE OF TEMPERATURE UPON ELASTIC LIMIT AND DISLOCATION MOBILITY OF SINGLE-CRYSTAL HgI2

F. Milstein, B. Farber, K. Kim, L. vandenBerg, and W. Schnepple 1982 26 p Presented at the 5th Intern. Workshop on HgI2 Nucl. Radiation Detectors, Jerusalem, 6 Jun. 1982 Prepared in cooperation with Edgerton, Germeshausen and Grier, Inc., Santa Barbara, Calif.

(Contract DE-AC08-76NV-01183)

(DE82-017694; CONF-820667-3) Avail: NTIS HC A03/MF A01

There are three primary observations were obtained. First, the initial CRSS i.e., the stress at which plastic deformation first occurs on the c shear planes, seems to be as low as 0.8 kpa (0.1 psi) and may, in fact, be much lower. This very low yield behavior, if confirmed by other tests, can be an important consideration in crystal growth and detector fabrication. Second, workhardened single crystals of mercuric iodide soften and become more ductile with increase temperatures. Third, hard glide dislocations are generated more easily and become more mobile at higher temperatures. These last two are intimately linked. The mobility of the hard glide dislocations at the higher temperatures allow for easier slip, thus lowering the yield stresses and increasing the ductility. DOE

N83-27267# Lehigh Univ., Bethlehem, Pa. Inst. of Fracture and Solid Mechanics.

NONLINEAR RESPONSE ARISING FROM NON SELF-SIMILAR CRACK GROWTH IN FINITE THICKNESS PLATES

G. C. Sih and C. Chen Jul. 1982 45 p refs

(Contract DE-AC04-76DP-00789)

(DE83-005946; ALO-1016) Avail: NTIS HC A03/MF A01

A three dimensional finite element procedure for finding the stresses in a finite thickness plate with a through crack is described. The Mode-1 loading is increased incrementally such that crack growth occurs in segments. The individual crack profiles are assumed to coincide with the locations of minimum strain energy density, (dW/dV/sub min/. Its shape changes during growth. Each successive crack growth increment increases even though the rising load increment is kept constant. Three different plate thickness to half crack length ratios were analyzed. An average critical crack ligament distance r/sub c/ = 0.72 in (0.437 cm) being independent of crack and specimen size was obtained. This corresponds to an analytically predicted fracture toughness S/sub c/ = r/sub c/ (dW/dV)/sub c/ = 15.489 lb/in (2708.825 N/m) for A533B steel at -100F. Data at low temperature were used to confine crack growth within the linear elastic range. DOE

N83-27268# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.

PROPAGATION OF CREEP CRACKS BY CAVITATION IN FINE-GRAINED MATERIALS M.S. Thesis

M. D. Thouless Nov. 1982 54 p refs

(Contract DE-AC03-76SF-00098)

(DE83-005869; LBL-14915) Avail: NTIS HC A04/MF A01

A damage model was developed for the propagation of cracks in polycrystalline ceramics at high temperatures, by the growth and coalescence of cavities in front of the crack tip. The model attempts to relate the crack velocity, stress intensity factor grain size and damage zone size. The effect of possible viscous constraints acting upon the damage zone caused by the creep of the grains in the undamaged matrix around the zone was explored. The various assumptions made in this model and possible further modifications are discussed and the theoretical predictions are compared with experimental results. DOE

N83-27269# Lulea Univ. (Sweden). Div. of Structural Engineering and Solid Mechanics.

A METHOD FOR TESTING COMPONENTS IN THE HIGH ACCELERATION FREQUENCY RANGE

Larsgunnar Nilsson and Bruno Nilsson 1981 31 p refs Sponsored by Swedish Defence Material Administration and Saab-Scania, Stockholm

(TULEA-1981-18; ISSN-0347-0881) Avail: NTIS HC A03/MF A01

A method for evaluating the failure acceleration-frequency curve is described. Peak accelerations, frequency and damping characteristics are obtained from acceleration records of a Hopkinson pressure bar technique. After each test the test object is inspected to detect mechanical or functional damage. If no damage can be detected, the test is repeated at a higher acceleration. Three different steel bars with lowest natural frequencies of 5 KHz, 10 KHz and 20 KHz were used. Harmonic accelerations with peak amplitudes up to 300,000 m/sec/sec were recorded. Results agree well with accelerometer data. The deviations between different tests on the same bar system are within a few percent. Author (ESA)

N83-27270# Hoegskolan i Luleaa (Sweden). Dept. of Mechanical Engineering.

STABILITY OF AN IMPACT-LOADED ELASTIC COLUMN WITH TWO DEGREES OF FREEDOM

Lixing Ren 1981 55 p refs

(TULEA-1981-05-T; ISSN-0349-3571) Avail: NTIS HC A04/MF A01

A two-degree-of-freedom model for an elastic column which is slightly eccentrically impacted by a mass is analyzed. Under the assumption of small displacements two second-order nonlinear ordinary differential equations for the coupled longitudinal and transverse vibrations of the column are reduced to Mathieu's equation when a perturbation method is used. The excitation parameters are the dimensionless initial velocity and the inverse slenderness ratio. Through the numerical solutions the stability boundaries of the first and second unstable regions are obtained. In the first unstable region there is a peak of maximum transverse displacement which is nearly twice the maximum longitudinal displacement. The maximum dimensionless longitudinal displacement is approximately equal to the dimensionless initial velocity and is independent of the slenderness ratio and the value of the small eccentric angle. Author (ESA)

N83-27271# Hoegskolan i Luleaa (Sweden). Dept. of Mechanical Engineering.

INFLUENCE OF DAMPING ON THE TRANSVERSE DISPLACEMENT OF AN IMPACT-LOADED COLUMN WITH TWO DEGREES OF FREEDOM

Lixing Ren 1981 32 p refs

(TULEA-1981-06-T; ISSN-0349-3571) Avail: NTIS HC A03/MF A01

A two-degree-of-freedom model for a slightly eccentrically impacted column with damping is analyzed. The impact load is produced by a mass striking the free end of the column. Under the assumption of small displacements two second-order nonlinear ordinary differential equations for the coupled longitudinal and transverse vibrations of the column are derived. Through the numerical solutions curves of the longitudinal displacement and transverse displacement versus time are obtained. Curves of the maximum transverse displacement versus inverse slenderness ratio of the column for different damping coefficients and initial velocities are obtained. These are compared with the curves obtained in the absence of damping. In the presence of damping the peak of the maximum transverse displacement, which appears without damping, decreases or vanishes. Author (ESA)

N83-27272# Hoegskolan i Luleaa (Sweden). Dept. of Mechanical Engineering.

EXPERIMENTAL INVESTIGATION OF A MECHANICAL IMPEDANCE GAUGE BASED ON MEASUREMENT OF STRAINS ON A CONICAL ROD

Lars Lagerkvist and K. G. Sundin 1981 62 p refs Sponsored by National Swedish Board for Technical Development

(TULEA-1981-66-T) Avail: NTIS HC A04/MF A01

A gage used to measure the mechanical point impedance of linear systems under harmonic excitation is described. Strain measurements are made at two different cross-sections of a conical gage rod. The gage rod is in contact with the object at its narrow end while its wide end is driven by a harmonic vibrator. The length of the gage rod is 260 mm and its end diameters are 9.8 mm and 20.1 mm. For cylindrical test objects a fair agreement is obtained between experimental and theoretical point impedances in the frequency range 50 Hz to 5 kHz. Author (ESA)

N83-27273# Hoegskolan i Luleaa (Sweden). Div. of Structural Engineering.

COMPOSITE BEAMS FROM A STATISTICAL POINT OF VIEW

Krister Cederwall and Kerstin Vaennman 1982 57 p refs

(TULEA-1982-05-T) Avail: NTIS HC A04/MF A01

The mechanical properties of composite beams are reviewed. The Cornell and Hasofer-Lind methods are described with special attention to the situation when correlation is present. Failure modes are treated from a statistical point of view with special regard to correlations between influential parameters. The difference in calculated formal risks for the different statistical methods used is demonstrated. In special cases, the complete beam-structure is considered when all the failure modes may occur. Author (ESA)

N83-27274# Lulea Univ. (Sweden). Dept. of Mechanial Engineering.

DETERMINATION OF MECHANICAL IMPEDANCE THROUGH STRAIN MEASUREMENT ON AN IMPACTED SLENDER ROD

Lars Lagerkvist and K. G. Sundin 1982 153 p refs Sponsored by National Swedish Board for Technical Development

(TULEA-1982-33-T; ISSN-0349-3571) Avail: NTIS HC A08/MF A01

An impedance gage based on measurement of strains at two cross sections of a slender rod is studied. The gage rod is in contact with the object at one end and is impacted at the other. The impedance is evaluated from the two strain signals by a two channel fast Fourier transformation analyzer and a desktop computer. Gage prototypes with cylindrical and conical geomtries were tested in the frequency range 50 Hz to 5 kHz for cylindrical objects with known theoretical point impedances. Satisfactory agreement between experimental and theoretical impedances is obtained for both prototypes. The BASIC program used is presented. Author (ESA)

N83-27275# Technical Research Centre of Finland, Espoo. Metals Lab.

AN EVALUATION OF THE PRECRACKED CHARPY TEST

Rauno Rintamaa Jan. 1983 33 p refs Sponsored by Finnish Ministry of Trade and Industry

(VTT-142; ISBN-951-38-1651-6; ISSN-0358-5077) Avail: NTIS HC A03/MF A01

Precracked Charpy tests were performed to evaluate fracture toughness parameters for a SA 508 C1.2 pressure vessel steel and to consider the validity of the proposed standard test method for instrumented impact testing of precracked Charpy specimens. One instrumented impact hammer with normal test geometry and one with an inverted test geometry were used. With the proposed standard method time to fracture and fracture before general yielding conditions are difficult to fulfill simultaneously. The energy

of the standard impact tester is often inadequate. For the inverted test geometry, results indicate that inaccuracies of the measured force values due to specimen oscillations can be diminished without significant damping of the load signal. This makes it possible to use high frequency response when elastic or elastic-plastic behavior of the material is tested. Author (ESA)

N83-27276# Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt m.b.H., Geesthacht (West Germany). Inst. fuer Werkstofftechnologie.

FATIGUE CRACK GROWTH FROM BLUNT NOTCHES

D. Rhodes 27 Oct. 1982 29 p refs

(GKSS-82/E/44; ISSN-0344-9629) Avail: NTIS HC A03/MF A01

Prediction methods for the formation and early growth of fatigue cracks at blunt notches are compared. Analysis of the crack tip plastic deformation, the cyclic contour integral, delta J, the strain in a critical volume of material, and the notch root plastic strain range are treated. It is shown that these approaches have fundamental elements in common, and that all are compatable with linear elastic fracture mechanics. Experimental results which show the incidence of notch root radius on fatigue life are presented. Author (ESA)

N83-27277# California Univ., Berkeley. Earthquake Engineering Research Center.

FURTHER STUDY OF THE EARTHQUAKE RESPONSE OF A BROAD CYLINDRICAL LIQUID-STORAGE TANK MODEL

George C. Manos and Ray W. Clough Jul. 1982 231 p refs Sponsored in part by Chevron Oil Field Research Co.

(PB83-147744; UCB/EERC-82/07) Avail: NTIS HC A11/MF A01 CSCL 13D

Results from a series of static and dynamic tests are reported. The investigation includes a shaking table study of essentially the same broad tank model tested in the first phase of this research program, but provided with more comprehensive instrumentation. It also includes a static tilt test study and measurements of the geometric imperfections of the tank model. The influence of such parameters as the base fixity, a cone roof at the top, the type and amplitude of the ground motion and the stiffness of the foundation material, on the response is studied. Finally the observed behavior is correlated with predictions made by standard design procedures. The need to incorporate in the design a reliable prediction of the uplift and of the high order response, including the influence of the foundation material, together with a more realistic failure criterion is demonstrated. GRA

N83-27278# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.

BENDING OF LAMINATED ANISOTROPIC SHELLS BY A SHEAR DEFORMABLE FINITE ELEMENT

J. N. Reddy Oct. 1982 29 p refs

(Grant AF-AFOSR-0142-81)

(PB83-145409; VPI-E-82.30; AFOSR-81-4TR) Avail: NTIS HC A03/MF A01 CSCL 20K

A shear deformable finite element is developed based on generalized first approximation shell theories. Numerical results are presented for bending of layered, anisotropic, composite shells. Various shell theories are included as special cases of the present element, and can be obtained by specifying the values of traces. The finite element solutions are compared with the exact solutions for certain shell problems. The agreement is found to be very good. GRA

N83-27279# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.

THE STRESS DISTRIBUTION ROUND AN INFINITE ROW OF CIRCULAR HOLES IN AN ORTHOTROPIC PLATE

Th. deJong Jan. 1982 62 p refs

(PB83-147157; LR-340) Avail: NTIS HC A04/MF A01 CSCL 20K

An approximation solution is presented for the stresses round an infinite row of unloaded, equal circular holes in an orthotropic plate loaded at infinity. The calculations are based on the analytical method of complex stress functions. The complex stress functions are evaluated from the boundary conditions of a single, central hole. The influence of the other holes is represented by Taylor expansions of the elementary stress functions of these holes in the neighborhood of the central hole. The use of series implies a limited accuracy of the solution. The numerical evaluation however shows that the convergence of the series is good. GRA

N83-27280# Atomic Energy Research Establishment, Harwell (England). Metallurgy Div.

A STUDY OF ELASTIC-PLASTIC FRACTURE PARAMETERS THROUGH THE THICKNESS OF FRACTURE TOUGHNESS SPECIMENS USING SILICONE-RUBBER CRACK IMPRESSIONS

G. P. Gibson and S. G. Druce Feb. 1983 29 p refs

(AERE-R-10815; HL83/454(C14)) Avail: NTIS HC A03/MF A01

Silicone rubber impressions of cracks in single edge notched, three and four point bend fracture toughness specimens were obtained for various degrees of applied displacement. The crack impressions were used to measure directly a number of elastic-plastic fracture parameters as functions of specimen geometry, ductile crack extension and position across the specimen thickness (i.e., constraint) (1) crack opening displacement (COD) measured at the original crack tip, (2) crack tip opening displacement (CTOD), measured at the growing crack tip, (3) crack opening angle, and (4) crack tip opening angle. Direct measurements of COD were compared with those indirectly determined by the conventional COD test and the potential of all the parameters as ductile fracture criteria assessed. The results show that both the COD at crack initiation, and the CTOD during growth, depend significantly on the degree of constraint, increasing by a factor of 2 from the central to near surface region of the specimens. S.L.

42 GEOSCIENCES (GENERAL)

No abstracts in this category.

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography.*

N83-27281* Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).

MAPPING OF LAND USE AND GEOMORPHOLOGY IN THE APAPORE PROJECT AREA BY LANDSAT SATELLITE DATA, VOLUME 2 [MAPEAMENTO DO USO DA TERRA E DA GEOMORFOLOGIA NA AREA DO PROJETO APAPORE, MS, ATRAVES DE DADOS DO SATELITE LANDSAT (VOLUME 2)]

Nelson de Jesus Parada, Principal Investigator, Armando Pacheco dosSantos, Hermann J. Kux, Tania Maria Sausen, Ana Maria Teixeira R. Bueno (Tecnicos do TERRASUL), Lorena Ferraro deSouza (Tecnicos do TERRASUL), and Joel Sadi D. Nunes (Tecnico do INAMB) Nov. 1982 125 p In PORTUGUESE Sponsored by NASA ERTS 3 Vol.

(E83-10333; NASA-CR-170389; NAS 1.26:170389; INPE-2564-RPE/423-Vol-2) Avail: NTIS HC A06 CSCL 05B

Maps of the 'Projeto APAPORE' study area at Mato Grosso do Sul State showing land use and geomorphological characteristics are presented. M.G.

N83-27282* Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
MAPPING OF LAND USE AND GEOMORPHOLOGY IN THE APAPORE PROJECT AREA BY LANDSAT SATELLITE DATA, VOLUME 3 [MAPEAMENTO DO USO DA TERRA E DA GEOMORFOLOGIA NA AREA DO PROJETO APAPORE, MS, ATRAVES DE DADOS DO SATELITE LANDSAT (VOLUME 3)]
Nelson de Jesus Parada, Principal Investigator, Armando Pacheco dosSantos, Hermann J. Kux, Tania Maria Sausen, Ana Maria Teixeira R. Bueno (Tecnicos do TERRASUL), Lorena Ferraro deSouza (Technicos do TERRASUL), and Joel Sadi D. Nunes (Tecnico do INAMB) Nov. 1982 250 p In PORTUGUESE Sponsored by NASA ERTS 3 Vol.
(E83-10334; NASA-CR-170390; NAS 1.26:170390;
INPE-2564-RPE/423-Vol-3) Avail: NTIS HC A11 CSCL 05B

Maps showing land use and geomorphological characteristics of the 'Projecto APAPORE' study area are presented. M.G.

N83-27283* Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
EVALUATION OF GROUND COVER AND LAND USE IN THE PDRI-AM REMOTE SENSING TECHNIQUE PROGRAM AREA [AVALIACOA DA COBERTURA VEGETAL E USODA TERRA NAS AREAS PROGRAMAS DO PDRI-AM ATRAVES DA TECNIA DE SENSORIAMENTO REMOTO]
Nelson de Jesus Parada, Principal Investigator, Joao Roberto dosSantos, Armando Pacheco dosSantos, and Luiz Carlos Servulo deAquino (Tecnico do Centro de Desenvolvimento) Apr. 1983 75 p refs In PORTUGUESE; ENGLISH summary Sponsored by NASA Original contains color illustrations ERTS
(E83-10230; NASA-CR-172667; NAS 1.26:172667;
INPE-2701-NTE/199) Avail: NTIS HC A04 CSCL 08B

Ground truth and automatically analyzed LANDSAT MSS digital data were used to assess vegetation cover and land use in the pilot areas of Barreirinha, Careiro, and Urucara (Amazonas State). The following classes were identified; upland dense equatorial forest; lowland dense equatorial forest; wetland forest (igapo); natural vegetation regrowth; lowland ranges; Montrichardia arborescens stand (aningais); campina; agricultural and pasture areas; barren soil; rivers of white water; and rivers of dark waters. The spectral parameters of the classes and the classification confusion matrix obtained by the MAXVER classification algorithm are discussed. The importance of LANDSAT data to the study of the spatial distribution of vegetation types and human influenced areas was demonstrated. It is concluded that Careiro has the highest agricultural and cattle raising potential. Uracara is expressive as a timer-logging area. Author

N83-27284*# California Univ., Berkeley. Space Sciences Lab.
DEVELOPMENT OF TECHNIQUES FOR PRODUCING STATIC STRATA MAPS AND DEVELOPMENT OF PHOTOINTERPRETIVE METHODS BASED ON MULTITEMPORAL LANDSAT DATA Final Report, 15 Nov. 1976 - 14 Dec. 1977
Robert N. Colwell, Principal Investigator Dec. 1977 151 p Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(Contract NAS9-14565)
(E83-10081; NASA-CR-167762; NAS 1.26:167762;
SSL-Ser-19-Issue-1) Avail: NTIS HC A08/MF A01 CSCL 08B

The results and progress of work conducted in support of the Large Area Crop Inventory Experiment (LACIE) are documented. Research was conducted for two tasks. These tasks include: (1) evaluation of the UCB static stratification procedure and modification of that procedure if warranted; and (2) the development of alternative photointerpretive techniques to the present LACIE procedure for the identification and selection of training areas for machine-processing of LACIE segments. Author

N83-27285*# Purdue Univ., Lafayette, Ind. Lab. for Applications of Remote Sensing.
PARALLEL PROCESSING IMPLEMENTATIONS OF A CONTEXTUAL CLASSIFIER FOR MULTISPECTRAL REMOTE SENSING DATA
Howard Jay Siegel, Philip H. Swain, and Bradley W. Smith Jun. 1980 12 p refs Presented at the 1980 Machine Process. of Remotely Sensed Data Symp. Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15466; Proj. AgRISTARS)
(E83-10273; NASA-CR-171664; SR-P1-04167; NAS 1.26:171664)
Avail: NTIS HC A02/MF A01 CSCL 05B

Contextual classifiers are being developed as a method to exploit the spatial/spectral context of a pixel to achieve accurate classification. Classification algorithms such as the contextual classifier typically require large amounts of computation time. One way to reduce the execution time of these tasks is through the use of parallelism. The applicability of the CDC flexible processor system and of a proposed multimicroprocessor system (PASM) for implementing contextual classifiers is examined. Author

N83-27286*# General Electric Co., Philadelphia, Pa.
LANDSAT-D DATA FORMAT CONTROL BOOK. VOLUME 6, APPENDIX C: PARTIALLY PROCESSED MULTISPECTRAL SCANNER HIGH DENSITY TAPE (HDT-AM)
Karen E. Andersen 15 Apr. 1982 80 p ERTS
(Contract NAS5-25300)
(E83-10274; NASA-CR-170544; NAS 1.26:170544;
GES-10077-Rev-D) Avail: NTIS HC A05/MF A01 CSCL 05B

The format of high density tapes which contain partially processed LANDSAT 4 and LANDSAT D prime MSS image data is defined. This format is based on and is compatible with the existing format for partially processed LANDSAT 3 MSS image data HDTs. A.R.H.

N83-27287*# General Electric Co., Philadelphia, Pa. Space Systems Div.
LANDSAT-D FLIGHT SEGMENT OPERATIONS MANUAL, VOLUME 1
J. Varhola Aug. 1982 749 p refs ERTS 2 Vol.
(Contract NAS5-25300)
(E83-10285; NASA-CR-170519; NAS 1.26:170519;
SVS-10266-Vol-1-Rev-B) Avail: NTIS HC A99/MF A01 CSCL 12B

Hardware, systems, and subsystems for the multimission modular spacecraft used for LANDSAT 4 are described and depicted in block diagrams and schematics. Components discussed include the modular attitude control system; the communication and data handling subsystem; the narrowband tape recorder; the on-board computer; the propulsion module subsystem; the signal conditioning and control unit; the modular power subsystem; the solar array drive and power transmission assembly; the power distribution unit; the digital processing unit; and the wideband communication subsystem. A.R.H.

N83-27288*# General Electric Co., Philadelphia, Pa. Space Systems Div.
LANDSAT-D FLIGHT SEGMENT OPERATIONS MANUAL, VOLUME 2
J. Varhola 31 Dec. 1981 551 p ERTS 2 Vol.
(Contract NAS5-25300)
(E83-10286; NASA-CR-170520; NAS 1.26:170520;
SVS-10266-Vol) Avail: NTIS HC A24/MF A01 CSCL 12B

Functions, performance capabilities, modes of operation, constraints, redundancy, commands, and telemetry are described for the thematic mapper; the global positioning system; the direct access S-band; the multispectral scanner; the payload correction; the thermal control subsystem; the solar array retention, deployment, and jettison assembly; and the boom antenna retention, deployment, and jettison assembly for LANDSAT 4. A.R.H.

N83-27289*# General Electric Co., Philadelphia, Pa. Space Systems Div.
LANDSAT-D FLIGHT SEGMENT OPERATIONS MANUAL. APPENDIX A: COEFFICIENTS/CALIBRATION DATA
A. Gilmore Jun. 1982 671 p ref ERTS 2 Vol.
(Contract NAS5-25300)

(E83-10287; NASA-CR-170521; NAS 1.26:170521; SVS-10266/3A) Avail: NTIS HC A99/MF A01 CSCL 12B

Telemetry calibration curves for the LANDSAT-4 subsystems are defined by nth order polynomial equations which convert telemetry counts to engineering units. The calibration curve coefficients for each telemetry point are controlled in the data base and are listed along with the unit section number where the sensor is located. Tables showing the coefficients may be obtained from the data base administrator. The tables show telemetry counts versus engineering units. A.R.H.

N83-27290*# General Electric Co., Philadelphia, Pa. Space Systems Div.

LANDSAT-D FLIGHT SEGMENT OPERATIONS MANUAL. APPENDIX B: OBC SOFTWARE OPERATIONS

R. Talipsky 31 Dec. 1981 501 p ERTS 2 Vol.

(Contract NAS5-25300)

(E83-10288; NASA-CR-170522; NAS 1.26:170522; SVS-10266-App-B) Avail: NTIS HC A22/MF A01 CSCL 12B

The LANDSAT 4 satellite contains two NASA standard spacecraft computers and 65,536 words of memory. Onboard computer software is divided into flight executive and applications processors. Both applications processors and the flight executive use one or more of 67 system tables to obtain variables, constants, and software flags. Output from the software for monitoring operation is via 49 OBC telemetry reports subcommutated in the spacecraft telemetry. Information is provided about the flight software as it is used to control the various spacecraft operations and interpret operational OBC telemetry. Processor function descriptions, processor operation, software constraints, processor system tables, processor telemetry, and processor flow charts are presented. A.R.H.

N83-27291*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

LANDSAT-4 TO GROUND STATION INTERFACE DESCRIPTION

Feb. 1983 179 p Revised ERTS

(E83-10292; NASA-TM-85310; GSFC-435-D-400-Rev-6; NAS 1.15:85310) Avail: NTIS HC A09/MF A01 CSCL 14B

The LANDSAT 4 to ground station interface is described in detail. The radiometric specifications, internal calibration, sensor output format, and data processing constants for the multispectral scanner and the thematic mapper are discussed. The mission payload telemetry, onboard computer telemetry, and engineering telemetry formats are described. In addition, the telemetry time signals and the onboard clock resetting procedure are addressed. M.G.

N83-27292*# EROS Data Center, Sioux Falls, S. Dak.

LANDSAT 4 INVESTIGATIONS OF THEMATIC MAPPER AND MULTISPECTRAL SCANNER APPLICATIONS

Donald T. Lauer, Principal Investigator and Don Moore 31 Mar. 1983 3 p ERTS

(NASA Order S-10757-C)

(E83-10301; NASA-CR-170373; NAS 1.26:170373) Avail: NTIS HC A02/MF A01 CSCL 08B

Digital data analyses suggest the potential for TM data to provide improved land cover information with the mid-IR band being especially useful. Coefficients of variations for major land categories were greater for MSS data channels than for TM channels. Interpretation of black and white images of the six reflective TM bands indicates a strong interpreter preference for bands 5 and 7 for making distinctions in most of the classification categories that were addressed; however, a strong case can be made for a color composite containing visible, near-IR, and mid-IR spectral regions when distinguishing vegetation. A transformation from each red, green, blue color space into hue, intensity, and saturation space has potential for enhanced interpretability of TM color composite images. A perspective view transformation was demonstrated that could be useful for presently registered layers of spatial data in an oblique view format. A.R.H.

N83-27293*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.

WILDLAND INVENTORY AND RESOURCE MODELING FOR DOUGLAS AND CARSON CITY COUNTIES, NEVADA, USING LANDSAT AND DIGITAL TERRAIN DATA

James A. Brass, William C. Likens, and R. Ronan Thornhill (Nevada Div. of Forestry, Carson City) Mar. 1983 50 p refs ERTS

(E83-10302; NASA-TP-2137; A-8997; NAS 1.60:2137) Avail: NTIS HC A03/MF A01 CSCL 08B

The potential of using LANDSAT satellite imagery to map and inventory pinyon-juniper desert forest types in Douglas and Carson City Counties, Nevada was demonstrated. Specific map and statistical products produced include land cover, mechanical operations capability, big game winter range habitat, fire hazard, and forest harvestability. The Nevada Division of Forestry determined that LANDSAT can produce a reliable and low-cost resource data. Added benefits become apparent when the data are linked to a geographical information system (GIS) containing existing ownership, planning, elevation, slope, and aspect information. A.R.H.

N83-27294*# Earth Satellite Corp., Chevy Chase, Md.

SELECTING BAND COMBINATIONS WITH THEMATIC MAPPER DATA

Charles Sheffield [1983] 12 p Sponsored by NASA ERTS

(E83-10303; NASA-CR-170374; NAS 1.26:170374) Avail: NTIS HC A02/MF A01 CSCL 20F

A problem arises in making color composite images because there are 210 different possible color presentations of TM three-band images. A method is given for reducing that 210 to a single choice, decided by the statistics of a scene or subscene, and taking into full account any correlations that exist between different bands. Instead of using total variance as the measure for information content of the band triplets, the elliposid of maximum volume is selected which discourages selection of bands with high correlation. The band triplet is obtained by computing and ranking in order the determinants of each 3 x 3 principal submatrix of the origianl matrix M. After selection of the best triplet, the assignment of colors is made by using the actual variances (the diagonal elements of M): green (maximum variance), red (second largest variance), blue (smallest variance). A.R.H.

N83-27295*# Houston Univ., Tex. Dept. of Mathematics.

THE POSSIBLE MODIFICATIONS OF THE HISSE MODEL FOR PURE LANDSAT AGRICULTURAL DATA

Charles Peters 10 Feb. 1981 14 p refs ERTS

(Contract NAS9-14689)

(E83-10305; NASA-CR-171624; SR-H1-04037; NAS 1.26:171624; Rept-77) Avail: NTIS HC A02/MF A01 CSCL 02C

A method for relaxing the assumption of class conditional independence of LANDSAT spectral measurements within the same patch (field) is discussed. Theoretical arguments are given which show that any significant refinement of the model beyond this proposal will not allow the reduction, essential to HISSE, of the pure data to patch summary statistics. A slight alteration of the new model is shown to be a reasonable approximation to the model which describes pure data elements from the same patch as jointly Gaussian with a covariance function which exhibits exponential decay with respect to spatial separation. M.G.

N83-27296*# Hunter Coll., New York.

MONITORING TROPICAL VEGETATION SUCCESSION WITH LANDSAT DATA Final Report

Vincent B. Robinson, Principal Investigator [1983] 49 p refs ERTS

(Grant NsG-5325)

(E83-10306; NASA-CR-170376; NAS 1.26:170376) Avail: NTIS HC A03/MF A01 CSCL 02F

The shadowing problem, which is endemic to the use of LANDSAT in tropical areas, and the ability to model changes over space and through time are problems to be addressed when monitoring tropical vegetation succession. Application of a trend surface analysis model to major land cover classes in a mountain-

ous region of the Phillipines shows that the spatial modeling of radiance values can provide a useful approach to tropical rain forest succession monitoring. Results indicate shadowing effects may be due primarily to local variations in the spectral responses. These variations can be compensated for through the decomposition of the spatial variation in both elevation and MSS data. Using the model to estimate both elevation and spectral terrain surface as a posteriori inputs in the classification process leads to improved classification accuracy for vegetation of cover of this type. Spatial patterns depicted by the MSS data reflect the measurement of responses to spatial processes acting at several scales. A.R.H.

N83-27297*# Southern Methodist Univ., Dallas, Tex. Center for Applied Mathematical and Statistical Research.
ESTABLISHMENT OF A CENTER OF EXCELLENCE FOR APPLIED MATHEMATICAL AND STATISTICAL RESEARCH Final Report, 1 Aug. 1981 - 31 Jan. 1983
Wayne A. Woodward and H. L. Gray Jan. 1983 107 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development
(Contract NAS9-16438; Proj. AgRISTARS)
(E83-10307; NASA-CR-171642; SR-63-04408; NAS 1.26:171642) Avail: NTIS HC A06/MF A01 CSCL 02C

The state of the art was assessed with regards to efforts in support of the crop production estimation problem and alternative generic proportion estimation techniques were investigated. Topics covered include modeling the greeness profile (Badhwarmos model), parameter estimation using mixture models such as CLASSY, and minimum distance estimation as an alternative to maximum likelihood estimation. Approaches to the problem of obtaining proportion estimates when the underlying distributions are asymmetric are examined including the properties of Weibull distribution. A.R.H.

N83-27298*# Elogic, Inc., Houston, Tex.
IMPROVED VERSION OF THE SPLIT ROUTINE FOR CLASSY
M. E. Rassbach Mar. 1981 16 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15981; Proj. AgRISTARS)
(E83-10308; NASA-CR-171644; SR-X1-04046; NAS 1.26:171644) Avail: NTIS HC A02/MF A01 CSCL 02C

The theoretical basis for a new version of the SPLIT routine for CLASSY is described. (The SPLIT routine is used to guess the positions of the parts of a cluster which is not normally distributed). The proposed routine would be a faster, more accurate replacement for the existing SPLIT routine, which was developed on an ad hoc basis. Author

N83-27299*# Elogic, Inc., Houston, Tex.
ASSEMBLY LANGUAGE CODING FOR CLASSY
M. E. Rassbach Jan. 1981 36 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15981; Proj. AgRISTARS)
(E83-10309; NASA-CR-171643; SR-X1-04033; NAS 1.26:171643; NAS-811) Avail: NTIS HC A03/MF A01 CSCL 02C

A set of assembly language improvements to the CLASSY clustering algorithm were developed and tested. These are described in detail and analyzed. Author

N83-27300*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
A NONPARAMETRIC CLUSTERING TECHNIQUE WHICH ESTIMATES THE NUMBER OF CLUSTERS
D. B. Ramey Jan. 1983 19 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E83-10310; NASA-CR-171635; IT-L3-04390; JSC-18592; NAS 1.26:171635; LEMSCO-18387) Avail: NTIS HC A02/MF A01 CSCL 02C

In applications of cluster analysis, one usually needs to determine the number of clusters, K, and the assignment of observations to each cluster. A clustering technique based on recursive application of a multivariate test of bimodality which automatically estimates both K and the cluster assignments is presented. M.G.

N83-27301*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
COMPOSITION AND ASSEMBLY OF A SPECTRAL AND AGRONOMIC DATA BASE FOR 1980 SPRING SMALL GRAIN SEGMENTS
D. Helmer, J. Krantz, M. L. Kinsler, and M. Tomkins Jan. 1983 21 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E83-10311; NASA-CR-171633; SR-L3-04392; JSC-18593; NAS 1.26:171633; LEMSCO-19023) Avail: NTIS HC A02/MF A01 CSCL 02C

A data set was assembled which consolidates the LANDSAT spectral data, ground truth observation data, and analyst cloud screening data for 28 spring small grain segments collected during the 1980 crop year. Author

N83-27302*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
METCOR4: A PROGRAM TO SIMULATE METSAT DATA
W. R. Johnson Jan. 1983 27 p ref Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E83-10313; NASA-CR-171636; EW-L3-00762; JSC-18599; NAS 1.26:171636; LEMSCO-18918) Avail: NTIS HC A03/MF A01 CSCL 02C

The METCOR4 program extracts radiation data from computer tapes and computes radiance as would be recorded by the NOAA6 and NOAA7 meteorological satellites (METSAT). Three different atmospheres, each with different aerosol concentration, are considered with the viewing geometry of the satellites and the expected solar geomtry. The FORTRAN program is provided. M.G.

N83-27303*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
ATMOSPHERIC EFFECTS ON METSAT DATA
W. R. Johnson Jan. 1983 33 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E83-10314; NASA-CR-171637; EW-L2-04387; JSC-18589; NAS 1.26:171637; LEMSCO-18836) Avail: NTIS HC A03/MF A01 CSCL 02C

When using the J. V. Dave dataset, two channels of simulated METSAT advanced very high resolution radiometer (AVHRR) data compare favorably with acutual data. Simulated NOAA6 and NOAA7 AVHRR data are presented as radiance profiles of reflected solar energy through atmosphere with three different aerosol levels. Effects of the atmosphere on the data are presented as functions of satellite view angle or pixel position on scanline. Vegetative index simultations are also profiled. Author

N83-27304*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
TECHNICAL SUMMARY OF ACCOMPLISHMENTS MADE IN PREPARATION FOR THE USSR BARLEY EXPLORATORY EXPERIMENT
G. M. Chapman and C. L. Dailey Dec. 1982 150 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15800; Proj. AgRISTARS)
(E83-10315; NASA-CR-171638; IT-L2-04386; JSC-18588; NAS 1.26:171638; LEMSCO-17763) Avail: NTIS HC A07/MF A01 CSCL 02C

The highlights of the work accomplished under each subcomponent of the U.S.S.R. Barley Pilot Experiment, which is scheduled

for completion in 1984, are summarized. A significant amount of developmental system implementation activity was in the final stages of preparation prior to the rescoping of project tasks. Unpublished materials which are significant to this exploratory experiment are incorporated into the appendixes. Author

N83-27305*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
AUSTRALIA GROUND DATA COLLECTION 1981-82 CROP YEAR, APPENDIXES A AND B, VOLUME 2 Summary Report
C. R. Quinones Dec. 1982 399 p Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS 2 Vol.
(Contract NAS9-15800; Proj. AgRISTARS)
(E83-10316; NASA-CR-171631; IT-L2-04381-Vol-2; JSC-18584-Vol-2; NAS 1.26:171631; LEMSCO-18650-Vol-231) Avail: NTIS HC A17/MF A01 CSCL 02C

Appendices containing computerized field data, code and term definitions, and photographs are presented. M.G.

N83-27306*# Lockheed Engineering and Management Services Co., Inc., Houston, Tex.
AUSTRALIA GROUND DATA COLLECTION 1981-82 CROP YEAR, VOLUME 1 Summary Report
C. R. Quinones Dec. 1982 289 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS 2 Vol.
(Contract NAS9-15800; Proj. AgRISTARS)
(E83-10317; NASA-CR-171632; IT-L2-04381-Vol-1; JSC-18584-Vol-1; NAS 1.26:171632; LEMSCO-18650-Vol-1) Avail: NTIS HC A13/MF A01 CSCL 02C

Under AgRISTARS management, ground data were collected at 20 agricultural sites within Australia during the crop year 1981-82. The data collection activity is summarized. Specifically, the following information is provided: discussion of data procedures, methods, and products; crop production results; photographs of the Australia agriculture scene, map sheets of segments, LANDSAT full frames, and aerial photographs of data collection areas; and summarizations of district agronomist reports. M.G.

N83-27307*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SIMULATING SOYBEAN CANOPY TEMPERATURE AS AFFECTED BY WEATHER VARIABLES AND SOIL WATER POTENTIAL
B. J. Choudhury Oct. 1982 27 p refs ERTS
(E83-10319; NASA-TM-84009; NAS 1.15:84009) Avail: NTIS HC A03/MF A01 CSCL 02C

Hourly weather data for several clear sky days during summer at Phoenix and Baltimore which covered a wide range of variables were used with a plant atmosphere model to simulate soybean (Glycine max L.) leaf water potential, stomatal resistance and canopy temperature at various soil water potentials. The air and dew point temperatures were found to be the significant weather variables affecting the canopy temperatures. Under identical weather conditions, the model gives a lower canopy temperature for a soybean crop with a higher rooting density. A knowledge of crop rooting density, in addition to air and dew point temperatures is needed in interpreting infrared radiometric observations for soil water status. The observed dependence of stomatal resistance on the vapor pressure deficit and soil water potential is fairly well represented. Analysis of the simulated leaf water potentials indicates overestimation, possibly due to differences in the cultivars. A.R.H.

N83-27308*# Lund Univ. (Sweden). Lab. of Remote Sensing.
MONITORING LAND DEGRADATION IN SOUTHERN TUNISIA: A TEST OF LANDSAT IMAGERY AND DIGITAL DATA
Ulf Hellden and Mikael Stern Sep. 1980 43 p refs Sponsored by NASA Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(E83-10320; NASA-CR-170380; NAS 1.26:170380; ISSN-0348-3339) Avail: NTIS HC A03/MF A01 CSCL 08G

The possible use of LANDSAT imagery and digital data for monitoring desertification indicators in Tunisia was studied. Field data were sampled in Tunisia for estimation of mapping accuracy in maps generated through interpretation of LANDSAT false color composites and processing of LANDSAT computer compatible tapes respectively. Temporal change studies were carried out through geometric registration of computer classified windows from 1972 to classified data from 1979. Indications on land degradation were noted in some areas. No important differences, concerning results, between the interpretation approach and the computer processing approach were found. Author

N83-27309*# Utah Univ., Salt Lake City. Center for Remote Sensing and Cartography.
DETECTION OF ASPEN/CONIFER FOREST MIXES FROM MULTITEMPORAL LANDSAT DIGITAL DATA
John A. Merola, Richard A. Jaynes, and Roy O. Harniss (Intermountain Forest and Range Experiment Station, Logan, Utah) Mar. 1983 18 p Sponsored in part by Dept. of Agriculture ERTS
(Grant NAGw-95)
(E83-10324; NASA-CR-170382; NAS 1.26:170382; CRSC-83-1) Avail: NTIS HC A02/MF A01 CSCL 02F

Aspen, conifer and mixed aspen/conifer forests were mapped for a 15-quadrangle study area in the Utah-Idaho Bear River Range using LANDSAT multispectral scanner (MSS) data. The digital MSS data were utilized to devise quantitative indices which correlate with apparently stable and seral aspen forests. The extent to which a two-date LANDSAT MSS analysis may permit the delineation of different categories of aspen/conifer forest mix was explored. Multitemporal analyses of MSS data led to the identification of early, early to mid, mid to late, and late seral stages of aspen/conifer forest mixing. A.R.H.

N83-27310*# Earth Satellite Corp., Chevy Chase, Md.
STUDY OF LANDSAT-D THEMATIC MAPPER PERFORMANCE AS APPLIED TO HYDROCARBON EXPLORATION Quarterly Progress Report, 7 Jan. - 7 Apr. 1983
John R. Everett, Principal Investigator 7 Apr. 1983 31 p ERTS
(Contract NAS5-27384)
(E83-10325; NASA-CR-170383; NAS 1.26:170383; QPR-2) Avail: NTIS HC A03/MF A01 CSCL 14B

Improved delineation of known oil and gas fields in southern Ontario and a spectacularly high amount of structural information on the Owl Creek, Wyoming scene were obtained from analysis of TM data. The use of hue, saturation, and value image processing techniques on a Death Valley, California scene permitted direct comparison of TM processed imagery with existing 1:250,000 scale geological maps of the area and revealed small outcrops of Tertiary volcanic material overlying Paleozoic sections. Analysis of TM data over Lawton, Oklahoma suggests that the reducing chemical environment associated with hydrocarbon seepage change ferric iron to soluble ferrous iron, allowing it to be leached. Results of the band selection algorithm show a suprising consistency, with the 1,4,5 combination selected as optimal in most cases. A.R.H.

N83-27311*# Computer Sciences Corp., Silver Spring, Md.
THE CLASSIFICATION OF LANDSAT DATA FOR THE ORLANDO, FLORIDA, URBAN FRINGE AREA
C. L.L Walthall and E. M. Knapp Dec. 1978 40 p refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(Contract NAS5-24350)
(E83-10327; NASA-CR-170512; NAS 1.26:170512; CSC/TM-78/6088) Avail: NTIS HC A03/MF A01 CSCL 05B

Procedures used to map residential land cover on the Orlando, Florida, Urban fringe zone are detailed. The NASA Bureau of the Census Applications Systems Verification and Transfer project and the test site are described as well as the LANDSAT data used as the land cover information sources. Both single-date LANDSAT

data processing and multitemporal principal components LANDSAT data processing are described. A summary of significant findings is included. A.R.H.

N83-27312*# Kent State Univ., Ohio. Dept. of Geology.
EFFECTS OF AUTOCORRELATION UPON LANDSAT CLASSIFICATION ACCURACY Final Report
Richard G. Craig, Principal Investigator [1983] 401 p refs Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(Contract NAS5-26111)
(E83-10328; NASA-CR-170510; NAS 1.26:170510) Avail: NTIS HC A18/MF A01 CSCL 05B

Richmond, Virginia and Denver, Colorado were study sites in an effort to determine the effect of autocorrelation on the accuracy of a parallelopiped classifier of LANDSAT digital data. The autocorrelation was assumed to decay to insignificant levels when sampled at distances of at least ten pixels. Spectral themes developed using blocks of adjacent pixels, and using groups of pixels spaced at least 10 pixels apart were used. Effects of geometric distortions were minimized by using only pixels from the interiors of land cover sections. Accuracy was evaluated for three classes; agriculture, residential and 'all other'; both type 1 and type 2 errors were evaluated by means of overall classification accuracy. All classes give comparable results. Accuracy is approximately the same in both techniques; however, the variance in accuracy is significantly higher using the themes developed from autocorrelated data. The vectors of mean spectral response were nearly identical regardless of sampling method used. The estimated variances were much larger when using autocorrelated pixels. A.R.H.

N83-27313*# Kansas State Univ., Manhattan. Evapotranspiration Lab.
ASSESSING SOLAR ENERGY AND WATER USE EFFICIENCIES IN WINTER WHEAT
G. Asrar, L. E. Hipps, and E. T. Kanemasu Sep. 1982 22 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-16457; Proj. AgRISTARS)
(E83-10329; NASA-CR-171659; SR-M2-04343; NAS 1.26:171659; Contrib-82-555-J) Avail: NTIS HC A02/MF A01 CSCL 02C

The water use and solar energy conversion efficiencies of two cultivars of winter wheat (Triticum aestivum L., vars, Centurk and Newton) planted at three densities, were examined during a growing season. Water use, based on soil moisture depletion, was the lowest under the light, and the highest under the heavy planting densities of both cultivars. Water use efficiency of medium and heavy planting densities were greater than the light planting densities in both cultivars. The canopy radiation extinction coefficients of both cultivars increased with increases in planting density. Efficiency of operation interception of photosynthetically active radiation by both cultivars improved from the time of jointing until anthesis, and then decreased during senescence. The efficiency of the conversion of intercepted radiation to dry matter (biochemical efficiency) decreased throughout the growing season both cultivars. The interception, biochemical, and photosynthetic efficiencies improved as planting density increased.
Author

N83-27314*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
MAPPING OF LAND USE AND GEOMORPHOLOGY IN THE APAPORE PROJECT AREA BY LANDSAT SATELLITE DATA, VOLUME 1 [MAPEAMENTO DO USO DA TERRA E DA GEOMORFOLOGIA NA AREA DO PROJETO APAPORE, MS, ATRAVES DE DADOS DO SATELITE LANDSAT (VOLUME 1)]
Nelson de Jesus Parada, Principal Investigator, Armando Pacheco dosSantos, Hermann J. Kux, Tania Maria Sausen, Ana Maria Teixeira R. Bueno (Tecnicos do TERRASUL), Lorena Ferraro deSouza (Tecnicos do TERRASUL), and Joel Sadi D. Nunes (Tecnico do INAMB) Nov. 1982 78 p refs In PORTUGUESE; ENGLISH summary Sponsored by NASA Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS 3 Vol.
(E83-10332; NASA-CR-170388; NAS 1.26:170388; INPE-2564-RPE/423-Vol-1) Avail: NTIS HC A05/MF A01 CSCL 05B

The results of a land use and geomorphological mapping of the so-called Projeto APAPORE area, at Mato Grosso do Sul State are presented. The study was carried out using multispectral scanner (MSS) and return beam vidicon LANDSAT images (channels 5 and 7 for the MSS) at the scale of 1:250,000 from 1980 through visual interpretation. The results indicate that pastureland is the most widespead class and that the agricultural areas re concentrated in the north of the area under study. The area covered with cerradao (arboreous savanna type) has a great areal extention, thus permitting the advance of the agricultural frontier. The geomorphological mapping can be useful to regional planning of future land use within the studied area. M.G.

N83-27315*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
REMOTE SENSING TECHNIQUES USED TO CHARACTERIZE SOIL EROSION IN SOUTHWESTERN SAO PAULO STATE M.S. Thesis - 29 Sep. 1982 [UTLIZACAO DE TECNICAS DE SENSORIAMENTO PARA A CARACTERIZACAO DE EROSAO DO SOLO NO SW DO ESTADO DE SAO PAULO]
Nelson de Jesus Parada, Principal Investigator and Sergio dos Anjos Ferreira Pinto Apr. 1983 123 p refs In PORTUGUESE; ENGLISH summary Sponsored by NASA Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(E83-10339; NASA-CR-172666; NAS 1.26:172666; INPE-2694-TDL/128) Avail: NTIS HC A06/MF A01 CSCL 13B

Within randomly sampled squares of a 1 km x 1 km grid, rill/gullies frequency, land cover/land use type and shape of the slopes were extracted from aerial photographs of the Ribeirao Anhumas drainage basin. Mean slope gradient, stream frequency and slope length were calculated on topographic maps. Ground truth data on fine sand/coarse sand ratio and vegetation cover densities were obtained. The MSS-LANDSAT-2 data (CCTs) were analyzed using single-cell, cluster synthesis and slicer algorithms. Graphical and statistical analyses of the data indicate that different slope gradients and land cover/land use types are the most significant factors related to the soil erosion process. The digital analysis of MSS data allowed the association among gray level classes and vegetation cover classes, which defined seven classes. These gray level classes and slope gradient classes were used to rank erosion risk. A.R.H.

N83-27316*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
GEOLOGIC MAPPING OF THE BAURU GROUP IN SAO PAULO STATE BY LANDSAT IMAGES [MAPEAMENTO GEOLOGICAO DO GRUPO BAURU NO ESTADO DE SAO PAULO, ATRAVES DE IMAGENS LANDSAT]
Nelson de Jesus Parada, Principal Investigator and Antonio Misson Godoy Mar. 1983 115 p refs In PORTUGUESE; ENGLISH summary Sponsored by NASA Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(E83-10341; NASA-CR-172668; NAS 1.26:172668; INPE-2661-TDL/119) Avail: NTIS HC A06/MF A01 CSCL 08B

The occurrence of the Bauru Group in Sao Paulo State was studied, with emphasis on the western plateau. Regional geological mapping was carried out on a 1:250.000 scale with the help of MSS/LANDSAT images. The visual interpretation of images consisted basically of identifying different spectral characteristics of the geological units using channels 5 and 7. Complementary studies were made for treatment of data with an Interative Image (I-100) analyser in order to facilitate the extraction of information, particularly for areas where visual interpretation proved to be difficult. Regional characteristics provided by MSS/LANDSAT images, coupled with lithostratigraphic studies carried out in the areas of occurrence of Bauru Group sediments, enabled the

homogenization of criteria for the subdivision of this group. A spatial distribution of the mapped units was obtained for the entire State of Sao Paulo and results were correlated with proposed stratigraphic divisions. Author

N83-27317*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A COMPUTER PROGRAM FOR THE SIMULATION OF HEAT AND MOISTURE FLOW IN SOILS
P. Camillo (Computer Sciences Corp., Silver Spring, Md.) and T. J. Schmugge May 1981 91 p refs ERTS
(Proj. AgRISTARS)
(E83-10342; NASA-TM-82121; SM-G1-04086; NAS 1.15:82121) Avail: NTIS HC A05/MF A01 CSCL 08M

A computer program that simulates the flow of heat and moisture in soils is described. The space-time dependence of temperature and moisture content is described by a set of diffusion-type partial differential equations. The simulator uses a predictor/corrector to numerically integrate them, giving wetness and temperature profiles as a function of time. The simulator was used to generate solutions to diffusion-type partial differential equations for which analytical solutions are known. These equations include both constant and variable diffusivities, and both flux and constant concentration boundary conditions. In all cases, the simulated and analytic solutions agreed to within the error bounds which were imposed on the integrator. Simulations of heat and moisture flow under actual field conditions were also performed. Ground truth data were used for the boundary conditions and soil transport properties. The qualitative agreement between simulated and measured profiles is an indication that the model equations are reasonably accurate representations of the physical processes involved. M.G.

N83-27318*# VBB/SWECO, Stockholm (Sweden). Div. for Water, Soil and the Environment.
SATELLITE MONITORING OF VEGETATION AND GEOLOGY IN SEMI-ARID ENVIRONMENTS
Ulf Kihlblom and Dick Johansson, Principal Investigators 1980 98 p refs Sponsored by NASA and Swedish Space Corp. Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(E83-10343; NASA-CR-172669; NAS 1.26:172669) Avail: NTIS HC A05/MF A01 CSCL 08G

The possibility of mapping various characteristics of the natural environment of Tanzania by various LANDSAT techniques was assessed. Interpretation and mapping were carried out using black and white as well as color infrared images on the scale of 1:250,000. The advantages of several computer techniques were also assessed, including contrast-stretched rationing, differential edge enhancement; supervised classification; multitemporal classification; and change detection. Results Show the most useful image for interpretation comes from band 5, with additional information being obtained from either band 6 or band 7. The advantages of using color infrared images for interpreting vegetation and geology are so great that black and white should be used only to supplement the colored images. A.R.H.

N83-27319*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
EFFECT OF SCENE ILLUMINATION CONDITIONS ON DIGITAL ENHANCEMENT TECHNIQUES OF MULTISPECTRAL SCANNER LANDSAT IMAGES [EFEITO DAS CONDICOES DE ILUMINACAO DA CENA SOBRE TECNICAS DE REALCE DIGITAL DE IMAGENS MSS/LANDSAT]
Nelson de Jesus Parada and Evlyn M. L. M. Novo Feb. 1983 42 p refs In PORTUGUESE; ENGLISH summary Presented at the 17th Intern. Symp. on Remote Sensing of Environ., Ann Arbor, Mich., 9-13 May 1983 Sponsored by NASA Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(E83-10344; NASA-CR-172670; NAS 1.26:172670; INPE-2644-PRE/262) Avail: NTIS HC A03/MF A01 CSCL 05B

Two sets of MSS/LANDSAT data with solar elevation ranging from 22 deg to 41 deg were used at the Image-100 System to implement the Eliason et alii tecnique for extracting the topographic modulation component. An unsupervised cluster analysis was used to obtain an average brightness image for each channel. Analysis of the enhanced imaged shows that the technique for extracting topographic modulation component is more appropriated to MSS data obtained under high sun elevation ngles. Low sun elevation increases the variance of each cluster so that the average brightness doesn't represent its albedo proprties. The topographic modulation component applied to low sun elevation angle damages rather than enhance topographic information. Better results were produced for channels 4 and 5 than for channels 6 and 7. Author

N83-27320*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
THE PONTA GROSSA ARCH: A PROPOSAL FOR TS CONFIGURATION AND EVOLUTION FROM THE INTERPRETATION OF REMOTE SENSING DATA M.S. Thesis [O ARCO DE PONTO GROSSA: UMA PROPOSTA PARA A SUA CONFIGURACAO E EVOLUCAO A PARTIR DA INTERPRETACAO DE DADOS DE SENSORIAMENTO REMOTO]
Nelson de Jesus Parada, Principal Investigator and Teodoro Isnard Ribeiro deAlmeida Jan. 1983 144 p refs In PORTUGUESE; ENGLISH summary Sponsored by NASA ERTS
(E83-10343; NASA-CR-172671; NAS 1.26:172671; INPE-2624-TDL/108) Avail: NTIS HC A07/MF A01 CSCL 05B

Visual analysis of MSS imagery was used to construct a map of dikes in a wide area of the Ponta Grossa Arch both in the Parana Basin and its basement. Analysis of the map by photographic methods defined the zone of highest density of the dikes, and some aspects of the longitudinal and transverse heterogeneities, as well as localized the apex of the Arch. Borders of the Arch were also suggested. Field investigations confirmed the position of the apex of the flexure on Palezoic sediments and pre-lava Mesozoic sediments. Controversial aspects of the relative absence of dikes in certain units or lithologies and the composition of intrusions surrounding the city of Castro were observed. The apparent synchronism between the activity of the Parana Basin and the Arch is discussed as well as the frequent inverse characteristics of vertical movements. The similarity of rocks in Brazil and Africa is also considered. A.R.H.

N83-27321*# State Univ. of New York, Syracuse.
STUDY TO ASSESS THE IMPORTANCE OF ERRORS INTRODUCED BY APPLYING NOAA 6 AND NOAA 7 AVHRR DATA AS AN ESTIMATOR OF VEGETATIVE VIGOR: FEASIBILITY STUDY OF DATA NORMALIZATION Final Report, 1 Nov. 1981 - 31 Oct. 1982
M. J. Duggin, Principal Investigator and D. Piwinski 31 Oct. 1982 134 p refs LANDSAT
(Contract NAS9-16514)
(E83-10346; NASA-CR-167835; NAS 1.26:167835) Avail: NTIS HC A07/MF A01 CSCL 02C

The use of NOAA AVHRR data to map and monitor vegetation types and conditions in near real-time can be enhanced by using a portion of each GAC image that is larger than the central 25% now considered. Enlargement of the cloud free image data set can permit development of a series of algorithms for correcting imagery for ground reflectance and for atmospheric scattering anisotropy within certain accuracy limits. Empirical correction algorithms used to normalize digital radiance or VIN data must contain factors for growth stage and for instrument spectral response. While it is not possible to correct for random fluctuations in target radiance, it is possible to estimate the necessary radiance difference between targets in order to provide target discrimination and quantification within predetermined limits of accuracy. A major difficulty lies in the lack of documentation of preprocessing algorithms used on AVHRR digital data. A.R.H.

N83-27322*# Georgia Univ., Athens. Dept. of Geography.
GEOMETRIC ACCURACY OF LANDSAT-4 MSS IMAGE DATA
R. Welch and E. Lynn Usery [1983] 11 p refs Presented at the LANDSAT-4 Sci. Characterization Early Results Symp.,

Greenbelt, Md., 22-24 Feb. 1983 ERTS
(Contract NAS5-27383)
(E83-10347; NASA-CR-172672; NAS 1.26:172672) Avail: NTIS HC A02/MF A01 CSCL 05B

Analyses of the LANDSAT-4 MSS image data of North Georgia provided by the EDC in CCT-p formats reveal that errors of approximately + or - 30 m in the raw data can be reduced to about + or - 55 m based on rectification procedures involving the use of 20 to 30 well-distributed GCPs and 2nd or 3rd degree polynomial equations. Higher order polynomials do not appear to improve the rectification accuracy. A subscene area of 256 x 256 pixels was rectified with a 1st degree polynomial to yield an RMSE sub xy value of + or - 40 m, indicating that USGS 1:24,000 scale quadrangle-sized areas of LANDSAT-4 data can be fitted to a map base with relatively few control points and simple equations. The errors in the rectification process are caused by the spatial resolution of the MSS data, by errors in the maps and GCP digitizing process, and by displacements caused by terrain relief. Overall, due to the improved pointing and attitude control of the spacecraft, the geometric quality of the LANDSAT-4 MSS data appears much improved over that of LANDSATS -1, -2 and -3. M.G.

N83-27323*# Environmental Research Inst. of Michigan, Ann Arbor. Infrared and Optics Div.
STUDY ON SPECTRAL/RADIOMETRIC CHARACTERISTICS OF THE THEMATIC MAPPER FOR LAND USE APPLICATIONS Quarterly Status Technical Progress Report, 21 Dec. 1982 - 20 Mar. 1983
William A. Malila, Principal Investigator and Michael D. Metzler 23 Mar. 1983 26 p refs ERTS
(Contract NAS5-27346)
(E83-10348; NASA-CR-172673; NAS 1.26:172673;
ERIM-164000-2-T; QSTPR-2) Avail: NTIS HC A03/MF A01 CSCL 08B

The change in mean signal level as a function of scan angle and scan direction was studied. The overall scan angle effect corresponded to that expected based on atmospheric modeling and scene characteristics. An initial, empirical correction model employing exponential decay was developed for reflective bands. Band 6 has a significant scan direction effect which is markedly different from that found in the reflective bands. A low frequency noise was discovered which was most pronounced in Band 1, detectors 4, 12, 10, and 8, having amplitudes of approximately 2.0, 1.5, 1.0, and 0.75 quantizing levels, respectively. This low frequency variation in mean signal amplitude was highly correlated among these four Band 1 detectors. Low frequency noise was also observed in Band 7, detector 7; band 2, detector 1; Band 3, detectors 1 and 16; and Band 5, detector 10. A.R.H.

N83-27324*# National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
EVALUATION OF TRENDS IN WHEAT YIELD MODELS
Mary C. Ferguson Dec. 1982 122 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Proj. AgRISTARS)
(E83-10349; NASA-TM-85347; SR-J1-04157; JSC-17428; NAS 1.15:85347; LEMSCO-17285) Avail: NTIS HC A06/MF A01 CSCL 02C

Trend terms in models for wheat yield in the U.S. Great Plains for the years 1932 to 1976 are evaluated. The subset of meteorological variables yielding the largest adjusted R(2) is selected using the method of leaps and bounds. Latent root regression is used to eliminate multicollinearities, and generalized ridge regression is used to introduce bias to provide stability in the data matrix. The regression model used provides for two trends in each of two models: a dependent model in which the trend line is piece-wise continuous, and an independent model in which the trend line is discontinuous at the year of the slope change. It was found that the trend lines best describing the wheat yields consisted of combinations of increasing, decreasing, and constant trend: four combinations for the dependent model and seven for the independent model. M.G.

N83-27325*# Environmental Research Inst. of Michigan, Ann Arbor.
RESEARCH AND DEVELOPMENT OF LANDSAT-BASED CROP INVENTORY TECHNIQUES Final Report, 16 Nov. 1980 - 31 Dec. 1981
Robert Horvath, Richard C. Cicone, and William A. Malila, Principal Investigators Jan. 1982 300 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS9-15476; Proj. AgRISTARS)
(E83-10359; NASA-CR-171645; MU-E2-04226; NAS 1.26:171645; ERIM-152400-21-F) Avail: NTIS HC A13/MF A01 CSCL 02C

A wide spectrum of technology pertaining to the inventory of crops using LANDSAT without in situ training data is addressed. Methods considered include Bayesian based through-the-season methods, estimation technology based on analytical profile fitting methods, and expert-based computer aided methods. Although the research was conducted using U.S. data, the adaptation of the technology to the Southern Hemisphere, especially Argentina was considered. Author

N83-27326*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
TEXTURE FUNCTIONS IN IMAGE ANALYSIS: A COMPUTATIONALLY EFFICIENT SOLUTION
Scott C. Cox and James F. Rose (Computer Science Corp., Silver Spring, Md.) Mar. 1983 20 p refs
(NASA-TM-85022; NAS 1.15:85022) Avail: NTIS HC A02/MF A01 CSCL 05B

A computationally efficient means for calculating texture measurements from digital images by use of the co-occurrence technique is presented. The calculation of the statistical descriptors of image texture and a solution that circumvents the need for calculating and storing a co-occurrence matrix are discussed. The results show that existing efficient algorithms for calculating sums, sums of squares, and cross products can be used to compute complex co-occurrence relationships directly from the digital image input. Author

N83-27327# Du Pont de Nemours (E. I.) and Co., Aiken, S.C.
GEOLOGY AND MINERAL RESOURCES OF THE BALTIMORE, BOSTON, LAKE CHAMPLAIN, AND PROVIDENCE 1 DEG BY 2 DEG NTMS QUADRANGLES. NATIONAL URANIUM RESOURCE EVALUATION PROGRAM
Barbara S. Karfunkel, comp. Mar. 1983 120 p refs
(Contract DE-AC09-76SR-00001)
(DE83-009825; GJBX-8(83); DPST-81-141-9) Avail: NTIS HC A06/MF A01

Maps and Geologic and mineral resources reports are presented for four Natonal Topographic Map Series (NTMS) Quadrangles in the northeastern United States. To provide background information to aid in the interpretation of National Uranium Resource Evaluation (NURE) geochemical reconnaissance data. For individual titles, see N83-27328 through N83-27331.

N83-27328# Johns Hopkins Univ., Baltimore, Md. Dept. of Earth and Planetary Science.
GEOLOGY AND MINERAL RESOURCES OF THE BALTIMORE 1 DEG BY 2 DEG NTMS QUADRANGLE, MARYLAND-PENNSYLVANIA-VIRGINIA
George W. Fisher and D. Brooks McKinney *In* du Pont de Nemours (E. I.) and Co. Geol. and Mineral Resources of the Baltimore, Boston, Lake Champlain, and Providence 1 deg by 2 deg NTMS Quadrangles. Natl. Uranium Resource Evaluation Program Mar. 1983 p 7-40 refs (For primary document see N83-27327 16-43) Avail: NTIS HC A06/MF A01

The kinds and locations of gneiss and metamorphosed Paleozoic and plastic sedimentary rocks in the Blue Ridge and Piedmont are identified as well as two series of igneous rocks in the Piedmont. The uranium potential of the area is difficult to

assess in view of the nearly total lack of relevant trace-element data. Minor amounts of uranium minerals were reported from two pegmatite dikes, and the high K2O content of some basement gneisses and several in-situ granitic rocks suggests that minor amounts of uranium could be present. If so, uranium may have been concentrated in younger sedimentary rocks derived from the Piedmont, by processes involving dissolution and reprecipitation; however, no such deposits yet reported. DOE

N83-27329# Dartmouth Coll., Hanover, N.H.
GEOLOGY AND MINERAL RESOURCES OF THE BOSTON 1 DEG BY 2 DEG NTMS QUADRANGLE, MASSACHUSETTS-NEW HAMPSHIRE
John B. Lyons *In* du Pont de Nemours (E. I.) and Co. Geol. and Mineral Resources of the Baltimore, Boston, Lake Champlain, and Providence 1 deg by 2 deg NTMS Quadrangles. Natl. Uranium Resource Evaluation Program Mar. 1983 p 41-64 refs (For primary document see N83-27327 16-43)
Avail: NTIS HC A06/MF A01

The tectonic units of the Boston 10 x 20 Quadrangle are, from east to west, the Avalon platform indented by the Narragansett, Norfolk, and Boston Basins, the Merrimack synclinorium, the Massabesic anticlinorium, and the Kearsarge synclinorium. At least 10 cycles of magmatic activity are known, ranging from Precambrian to Jurassic. Extensive faulting (right lateral in part) has affected all the rocks, but particularly the Avalon platform. The area is generally poor in mineral resources, but has supported some base-metal mining and coal mining. Coal reserves may total 1110 million tons (Skehan and others, 1977). Occurrences of uranium and thorium are not wide-spread and seem to be restricted to pegmatites. DOE

N83-27330# Vermont Univ., Burlington.
GEOLOGY AND MINERAL RESOURCES OF THE LAKE CHAMPLAIN 1 DEG BY 2 DEG NTMS QUADRANGLE, NEW HAMPSHIRE-NEW YORK-VERMONT
David P. Bucke *In* du Pont de Nemours (E. I.) and Co. Geol. and Mineral Resources of the Baltimore, Boston, Lake Champlain, and Providence 1 deg by 2 deg NTMS Quadrangles. Natl. Uranium Resource Evaluation Program Mar. 1983 p 65-102 refs (For primary document see N83-27327 16-43)
Avail: NTIS HC A06/MF A01

The Lake Champlain 10 x 20 Quadrangle includes two geologically distinct areas, the division between them being marked rather accurately by Lake Champlain. An extension of the Canadian Shield, the Adirondack Mountains which are more than one billion years old, lie west of the lake. To the east are Paleozoic rocks. These are relatively underformed and unmetamorphosed in the Champlain Valley, but reach into high-grade metamorphics further east in the Green Mountains. The geologic history of these areas are provided to aid in evaluating the uranium potential. DOE

N83-27331# Rhode Island Univ., Kingston. Dept. of Geology.
GEOLOGY AND MINERAL RESOURCES OF THE PROVIDENCE 1 DEG BY 2 DEG NTMS QUADRANGLE, CONNECTICUT-MASSACHUSETTS-RHODE ISLAND
O. Don Hermes *In* du Pont de Nemours (E. I.) and Co. Geol. and Mineral Resources of the Baltimore, Boston, Lake Champlain, and Providence 1 deg by 2 deg NTMS Quadrangles. Natl. Uranium Resource Evaluation Program Mar. 1983 p 103-127 refs (For primary document see N83-27327 16-43)
Avail: NTIS HC A06/MF A01

The bedrock geology and structure of the Providence 10 x 20 Quadrangle, which includes nearly all of Rhode Island and much of southeastern Massachusetts and easternmost Connecticut are summarized provide geologic background data that may be useful in uranium potential within the Providence Quadrangle. Selected types of mineral occurrences and deposits are described. DOE

N83-27332# TRW, Inc., Lawndale, Calif.
DATA BASE FOR HYDRAULICALLY STIMULATED GAS WELLS PRODUCING FROM TIGHT SANDS FORMATIONS Final Report
Mar. 1982 14 p ref
(Contract DE-AC21-81MC-16554)
(DE82-013029; DOE/MC-16554/1172) Avail: NTIS HC A02/MF A01

A data base was assembled in 1978 consisting of well records from more than 900 hydraulically fractured wells in the Piceance, Uinta, Washakie, Sand Wash, and Denver Basins. The purpose of the present study is to develop a western gas sand computerized data base for hydraulically stimulated gas wells by adapting and expanding the abovementioned data file. This report describes the data file, tasks accomplished to date, and a sample well record. DOE

N83-27333# Marathon Oil Co., Bridgeport, Ill.
COMMERCIAL SCALE DEMONSTRATION: ENHANCED OIL RECOVERY BY MICELLAR-POLYMER FLOOD Annual Report, Oct. 1980 - Sep. 1981
J. C. Howell Bartlesville, Okla. DOE May 1982 131 p
(Contract DE-AC03-78ET-13077)
(DE82-013574; DOE/ET-13077/63) Avail: NTIS HC A07/MF A01

This commercial scale test, known as the M-1 Project, is located in Crawford County, Illinois. It encompasses 407 acres of Robinson sand reservoir and covers portions of several waterflood projects that were approaching economic limit. The project includes 248 acres developed on a 2.5-acre five-spot pattern and 159 acres developed on a 5.0-acre five-spot pattern. Development work commenced in late 1974 and has previously been reported. Micellar solution (slug) injection was initiated on February 10, 1977, and is now completed. After 10% of a pore volume of micellar slug was injected, injection of 11% pore volume of Dow 700 Pusher polymer was conducted at a concentration of 1156 ppM. At the end of this reporting period, 625 ppM polymer was being injected into the 2.5-acre pattern and 800 ppM polymer was being injected into the 5.0-acre pattern. The oil cut of the 2.5-acre pattern has decreased from 11.0% in September 1980, to 7.9% in September 1981. DOE

N83-27334# Department of Energy, Dallas, Tex. Energy Information Administration.
LIBYA, ALGERIA AND EGYPT: CRUDE OIL POTENTIAL FROM KNOWN DEPOSITS
W. D. Dietzman, N. R. Rafidi, and T. A. Ross Apr. 1982 122 p refs
(DE82-018578; DOE/EIA-0338) Avail: NTIS HC A06/MF A01

An analysis is presented of the discovered crude oil resources, reserves, and estimated annual production from known fields of the Republics of Libya, Algeria, and Egypt. Proved reserves are defined as the remaining producible oil as of a specified data under operating practice in effect at that time and include estimated recoverable oil in undrilled portions of a given structure or structures. Also included in the proved reserve category are the estimated indicated additional volumes of recoverable oil from the entire oil reservoir where fluid injection programs have been started in a portion, or portions, of the reservoir. The indicated additional reserves (probable reserves) reported herein are the volumes of crude oil that might be obtained with the installation of secondary recovery or pressure maintenance operations in reservoirs where none have been previously installed. DOE

N83-27335# Bendix Field Engineering Corp., Grand Junction, Colo.
STATISTICAL TECHNIQUES APPLIED TO AERIAL RADIOMETRIC SURVEYS (STAARS): APPLICATION OF THE HUBER M-ESTIMATOR TO AERIAL RADIOMETRIC DATA FOR THE IDENTIFICATION OF HOST AND SOURCE AREAS FOR URANIUM DEPOSITS
Frederic L. Pirkle, Charles D. Koch, Newton K. Stablein, Richard J. Beckman, Thomas R. Bement, Gary L. Tietjen, and Jo Ann Howell Jul. 1982 68 p refs Prepared in cooperation with Los Alamos National Lab.
(Contracts DE-AC13-76GJ-01664; W-7405-eng-36)
(DE82-018199; GJBX-136-82) Avail: NTIS HC A04/MF A01

Throughout the aerial radiometric survey portion of the US Department of Energy National Uranium Resource Evaluation (NURE) program, the detection of significantly low or high radioelement values has been an important aid in identifying regions with either higher than expected or lower than expected radioelement concentrations. In this paper, a robust method employing Huber M-estimators has been utilized to analyze aerial radioelement data for significantly high and low values. All possibly significant highs and lows have been mapped spatially to locate geographically those areas that may be favorable as hosts and sources for uranium deposits. The robust Huber method has been automated with all referenced computer programs having been written for a CDC 6600. DOE

N83-27336# Oak Ridge Gaseous Diffusion Plant, Tenn. Uranium Resource Evaluation Project.
NATIONAL URANIUM RESOURCE EVALUATION PROGRAM: SUPPLEMENT TO HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE BASIC DATA REPORTS K/UR-405 AND K/UR-408 THROUGH K/UR-443 BAD CAPS LANGUAGE [GJBX-52(82)throughGJBX-88(82)]
18 Mar. 1982 25 p refs
(Contract W-7405-eng-26)
(DE82-013774; GJBX-51(82); K/UR-444) Avail: NTIS HC A02/MF A01

Geochemical surveys were conducted in various quadrangles located in the eastern and western United States. These quadrangles are listed and their locations are also shown on the respective maps. Stream sediment analysis for uranium and 30 other elements were conducted and statistical summaries of results are presented in a table. Uranium was analyzed by fluorescence spectroscopy and neutron activation analysis. The other 30 elements were determined by emission spectroscopy. DOE

N83-27337# Occidental Research Corp., Irvine, Calif.
METHANE RECOVERY FROM HORIZONTAL HOLES IN ADVANCE OF MINING Final Report
B. Rao Pothini Mar. 1982 107 p refs
(Contract DE-AC21-81MC-16372)
(DE82-017673; DOE/MC-16372/56) Avail: NTIS HC A06/MF A01

This methane drainage report covers work performed for the US Department of Energy under Contract DE-AC21-81MC16373 by Occidental Research Corporation during the period January 1, 1981 through March 31, 1982. The primary objective of the production drilling was to drain sufficient quantities of gas from the coal bed in advance of mining for utilization in the coal driven at the Virginia Pochahontas Division No. 5 Mine. During the reporting period a total of 10,367 feet of production drilling was completed compared to the targeted aggregate depth of 5000 feet. In addition, exploration drilling was conducted in two mines totaling to 3750 feet. The production holes have drained 188 MMCF of gas during this period. Since inception of the methane drainage program a grand total of 23,000 feet of horizontal holes have been drilled and approximately 673 MMCF of commercial quality gas has been found. Daily gas production at the end of the period was 1.5 MCFD. DOE

N83-27338# Kansas Univ., Lawrence.
ASSESSMENT OF THE GEOTHERMAL RESOURCES OF KANSAS
Jun. 1982 65 p
(Contract DE-AS07-79ET-27204)
(DE83-003216; DOE/ET-27204/T1-V2-App-Sect-5) Avail: NTIS HC A04/MF A01

Thermal data for some deep wells in Kansas are given. DOE

N83-27339# Morgantown Technology Center, W. Va.
DEEP-SOURCE-GAS WORKSHOP TECHNICAL PROCEEDINGS
W. J. Gwilliam, ed. Sep. 1982 190 p refs Presented at the DOE Deep Source Gas Workshop, Morgantown, W. Va., 3-4 May 1982
(DE83-005003; DOE/METC-81-50; CONF-8205138) Avail: NTIS HC A09/MF A01

Ten papers were presented at the Deep-Source Gas Workshop. Laser papers are included in this proceedings under the following headings: (1) abiogenic origin of deep source gas; (2) geochemical and thermodynamic studies of deep source gas; (3) detection and differential of deep souce gases; (4) deep sedimentary basin gas; (5) deep source gas associated with ectonic processes at convergent margins. All papers have been abstracted and indexed for the Energy Data Base. DOE

N83-27340# Lulea Univ. (Sweden). Div. of Water Resources Engineering.
ON THE NUMERICAL PREDICTION OF VERTICAL TURBULENT EXCHANGE IN STRATIFIED FLOWS
Urban Svensson 1981 12 p refs Presented at 2nd Intern. Symp. on Stratified Flows, Trondheim, Norway, 24-27 Jun. 1980; sponsored by Norwegian Institute of Technology
(TULEA-1981-08; Ser-A-58; ISSN-0347-0881) Avail: NTIS HC A02/MF A01

The development of a mixed density layer in a stratified saline water flow was studied for different initial and boundary conditions in order to determine the dimensionless entrainment velocity as a function of an overall Richardson number. The mathematical model is based on the conservation laws for momentum and salinity. A two-equation turbulence model is used for the determination of exchange coefficients. A sensitivity study indicates that the turbulent Prandtl number for salinity and the buoyancy term in the equation determining the turbulent length scale are very influential. Suggestions for these terms are presented. A comparison between predictions and measurements of the laboratory flow considered supports the mathematical formulation put forward. Author (ESA)

N83-27341# Lulea Univ. (Sweden). Div. of Water Resources Engineering.
STATE SPACE MODELS OF THE NASH CASCADE: KINEMATIC AND DIFFUSION WAVES
Andras Szoelloesi-Nagy 1981 35 p refs
(TULEA-1981-14; Ser-A-68; ISSN-0347-0881) Avail: NTIS HC A03/MF A01

The unified state space modeling of the Nash-cascade, the kinematic wave, and the diffusion wave linear runoff models is outlined. As there is no feedforward control, the impulse responses are not discontinuous functions. The system matrices for the Nash-cascade and kinematic wave are Toeplitzian with the same structure while the input/output matrices are in a dual relationship. The spatially discretized diffusion wave possesses a Hessenberg type system matrix, whose matrix exponential is given. The boundary conditions appear as input functions in the continuous state equations. For reasons of observability, flow measurements at one internal section at least are required. The impulse response functions of the diffusion wave are the generalizations of that of the kinematic wave backwater effects. Author (ESA)

N83-27342# Lulea Univ. (Sweden). Div. of Water Resources Engineering.
ON THE DISCRETIZATION OF THE CONTINUOUS NASH-CASCADE
Andras Szoelloesi-Nagy 1981 33 p refs
(TULEA-1981-17; Ser-A-71; ISSN-0347-0881) Avail: NTIS HC A03/MF A01

The continuous Nash-cascade model is discretized by digital filtering techniques, using the principles of state space modeling. The continuous state variable model of the Nash cascade together with the computation of the state transition matrix and the impulse response are given. A discrete state variable model whose state and input transition matrices are in a dual relationship is derived. Different discrete state representations of the continuous Nash-cascade are related to each other via a linear transformation. In the limit case the discrete state models are identical with the continuous Nash-cascade. The discrete state models are discretely coincident with the continuous model but at

the same time consider the dynamic changes in between the sampling points. Author (ESA)

N83-27343# Institut National de la Recherche Agronomique, Avignon (France).
YIELD FORECASTING FROM REMOTE SENSING DATA: A SURVEY OF METHODS AVAILABLE IN 1982
Ph. Malet 1982 37 p refs
(Rept-M/83/5) Avail: NTIS HC A03/MF A01

Vegetation spectral indexes, biological information from microwaves, a vegetation thermal index, the warning of crop stresses from vegetation indexes, the supervision of climatic factors such as precipitation, temperature, insolation and evapotranspiration, the supervision of agricultural practices, and the use of remote sensing data in Agromet models either as alarm and yield reduction models or as remote sensing data in crop-weather models are discussed. Author (ESA)

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N83-27344* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ZIRCONIUM CARBIDE AS AN ELECTROCATALYST FOR THE CHROMOUS-CHROMIC REDOX COUPLE Patent
Randall F. Gahn, Margaret A. Reid, and Chiang Y. Yang, inventors (to NASA) Issued 22 May 1981 8 p Filed 22 May 1981 Supersedes N81-26203 (19 - 18, p 2506)
(NASA-Case-I EW-13246-1; US-Patent-4,382,116; US-Patent-Appl-SN-266255; US-Patent-Class-429-34; US-Patent-Class-429-40; US-Patent-Class-429-105; US-Patent-Class-429-107; US-Patent-Class-429-109) Avail: US Patent and Trademark Office CSCL 10C

Zirconium carbide is used as a catalyst in a REDOX cell for the oxidation of chromous ions to chromic ions and for the reduction of chromic ions to chromous ions. The zirconium carbide is coated on an inert electronically conductive electrode which is present in the anode fluid of the cell.

Official Gazette of the U.S. Patent and Trademark Office

N83-27345*# Engelhard Industries, Inc., Edison, N.J.
DEVELOP AND TEST FUEL CELL POWERED ON-SITE INTEGRATED TOTAL ENERGY SYSTEMS. PHASE 3: FULL-SCALE POWER PLANT DEVELOPMENT Quarterly Report, May - Jul. 1982
20 Apr. 1983 26 p
(Contracts DEN3-241; DE-AI01-80ET-17088)
(NASA-CR-168021; DOE/NASA/0241-6; NAS 1.26:168021; QR-6) Avail: NTIS HC A03/MF A01 CSCL 10A

Satisfactory performance is reported for the first three 12-cell sub-stacks of the 5 kW stack rebuild. Early general conclusions are presented from an economic study. Results are reported on a successful 700-hour test of a 3-cell stack in the full-sized configuration (0.33m x 0.56m). Construction of a 5 kW equivalent methanol/steam reformer based on a commercial shell-and-tube heat exchanger was completed. Several test runs are summarized. Preliminary conclusions are presented on the technical and economic aspects of fuel cell/HVAC interaction. Physical data are presented on several dense graphite materials which are candidates for gas-distribution plates. Performance of a new cathode catalyst is reported. Author

N83-27346*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
TEST RESULTS AND DESCRIPTION OF A 1-kW FREE-PISTON STIRLING ENGINE WITH A DASHPOT LOAD
Jeffrey Schreiber 1983 22 p refs Presented at 18th Intersoc. Energy Conversion Engr. Conf., Orlando, Fla., 21-26 Aug. 1983
(Contract DE-AI05-82OR-1055)
(NASA-TM-83407; DOE/NASA/1005-1; E-1688; NAS 1.15:83407) Avail: NTIS HC A02/MF A01 CSCL 10B

A 1 kW (1.33 hp) single cylinder free piston Stirling engine was installed in the test facilities at the Lewis laboratory. The engine was designed specifically for research of the dynamics of its operation. A more complete description of the engine and its instrumentation is provided in a prior NASA paper TM-82999 by J. G. Schreiber. Initial tests at Lewis showed the power level and efficiency of the engine to be below design level. Tests were performed to help determine the specific problems in the engine causing the below design level performance. Modifications to engine hardware and to the facility where performed in an effort to bring the power output and efficiency to their design values. As finally configured the engine generated more than 1250 watts of output power at an engine efficiency greater than 32 percent. This report presents the tests performed to help determine the specific problems, the results if the problem was eliminated, the fix performed to the hardware, and the test results after the engine was tested. In cases where the fix did not cause the anticipated effects, a possible explanation is given. Author

N83-27347*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FABRICATION OF LOW-COST MOD-OA WOOD COMPOSITE WIND TURBINE BLADES Final Report
R. F. Lark, M. Gougeon (Gougeon Brothers, Inc., Bay City, Mich.), G. Thomas (Gougeon Brothers, Inc., Bay City, Mich.), and M. Zuteck (Gougeon Brothers, Inc., Bay City, Mich.) Feb. 1983 70 p refs
(Contract DE-AI01-79ET-20320)
(NASA-TM-83323; E-1564; DOE/NASA/20320-45; NAS 1.15:83323) Avail: NTIS HC A04/MF A01 CSCL 10A

The wood composite blades were fabricated by using epoxy resin-bonded laminates of Douglas fir veneers for the leading edge spar sections and honeycomb-cored birch plywood panels for the blade trailing edge or afterbody sections. The blade was joined to the wind turbine hub assembly by epoxy resin-bonded steel load take-off studs. The wood composite blades were installed in the Mod-OA wind turbine test facility at Kahuku, Hawaii. The wood composite blades have successfully completed high power (average of 150 kW) operations for an eighteen month period (nearly 8,000 hr) before replacement with another set of wood composite blades. The original set of blades was taken out of service because of the failure of the shank on one stud. An inspection of the blades at NASA-Lewis showed that the shank failure was caused by a high stress concentration at a corrosion pit on the shank fillet radius which resulted in fatigue stresses in excess of the endurance limit. Author

N83-27348*# Engelhard Corp., Menlo Park, Calif.
DEVELOP AND TEST FUEL CELL POWERED ON-SITE INTEGRATED TOTAL ENERGY SYSTEM Quarterly Report
A. Kaufman and G. K. Johnson 20 Apr. 1983 26 p
(Contracts DEN3-241; DE-AI-01-80ET-17088)
(NASA-CR-168021; NAS 1.26:168021; QR-6) Avail: NTIS HC A03/MF A01 CSCL 10A

Satisfactory performance is reported for the first three 12-cell sub-stacks of the 5kW stack rebuild. Early general conclusions are presented from an economic study of OS/IES. Results are reported on a successful 700-hour test of a 3-cell stack in the full-sized configuration (0.33m x 0.56m). Construction of a 5-kW-equivalent methanol/steam reformer based on a commercial shell-and-tube heat exchanger was completed. Several test runs are summarized. Preliminary conclusions are presented on the technical and economic aspects of fuel cell/HVAC interaction for OS/IES as developed. Physical data are presented on several

dense graphite materials which are candidates for gas-distribution plates. Performance of a new cathode catalyst is reported. Author

N83-27349# RAND Corp., Santa Monica, Calif.
HOUSEHOLD ENERGY CONSERVATION: STRATEGIES FOR BEHAVIORAL RESEARCH
Sandra H. Berry and John D. Winkler Oct. 1982 53 p refs Sponsored by DOE
(RAND/N-1909-DOE) Avail: NTIS HC A04/MF A01

Research in the behavioral and social sciences on household energy conservation is reviewed. The research and the savings in energy achieved are described. Areas for future research that will extend or enhance the findings are suggested. Author

N83-27350# RAND Corp., Santa Monica, Calif.
AN APPRAISAL OF EVALUATIONS OF UTILITY SPONSORED PROGRAMS FOR RESIDENTIAL ENERGY CONSERVATION
Sara R. Pease Nov. 1982 77 p refs
(Contract DE-AC01-80PE-70269)
(RAND-N-1925-DOE) Avail: NTIS HC A05/MF A01

Eight past evaluations of utility sponsored energy conservation programs are reviewed and their results and implications for the future success of a federal or utility sponsored residential conservation service (RCS) are discussed. Author

N83-27351*# Naval Weapons Support Center, Crane, Ind. Weapons Quality Engineering Center.
EVALUATION PROGRAM FOR SECONDARY SPACECRAFT CELLS. CYCLE LIFE TEST Annual Report
J. D. Harkness 22 Feb. 1982 298 p
(NASA Order C-13105-D)
(NASA-CR-172679; NAS 1.26:172679; WQEC/C-82-23; AR-18) Avail: NTIS HC A13/MF A01 CSCL 10C

Evaluation of secondary spacecraft cells was begun according to the program outline. The cycle life test of the evaluation program of secondary spacecraft cells, through 15 December 1981 is covered. Author

N83-27352*# Naval Weapons Support Center, Crane, Ind. Weapons Quality Engineering Center.
EVALUATION PROGRAM FOR SECONDARY SPACECRAFT CELLS. CYCLE LIFE TEST Annual report
J. D. Harkness 1983 300 p
(NASA Order C-13105-D)
(NASA-CR-172680; NAS 1.26:172680; WQEC/C-83-1; AR-19) Avail: NTIS HC A13/MF A01 CSCL 10C

Evaluation of secondary spacecraft was begun. The cycle life test of the evaluation program of secondary spacecraft cells, through 15 December 1982 is covered. Author

N83-27353*# Westinghouse Research and Development Center, Pittsburgh, Pa.
LARGE-AREA SHEET TASK: ADVANCED DENDRITIC-WEB-GROWTH DEVELOPMENT Annual Report, 23 Oct. 1981 - 22 Oct. 1982
C. S. Duncan, R. G. Seidensticker, J. P. McHugh, and J. Schruben 18 Jan. 1983 81 p refs
(Contract JPL-955843)
(NASA-CR-172683; NAS 1.26:172683; DOE/JPL-955843-83/8; DE83-008871) Avail: NTIS HC A05/MF A01 CSCL 10A

Thermally generated stresses in the growing web crystal were reduced. These stresses, which if too high cause the ribbon to degenerate, were reduced by a factor of three, resulting in the demonstrated growth of high-quality web crystals to widths of 5.4 cm. This progress was brought about chiefly by the application of thermal models to the development of low-stress growth configurations. A new temperature model was developed which can analyze the thermal effects of much more complex lid and top shield configurations than was possible with the old lumped shield model. Growth experiments which supplied input data such as actual shield temperature and melt levels were used to verify the modeling results. Desirable modifications in the melt level-sensing circuitry were made in the new experimental web growth furnace, and this furnace has been used to carry out growth experiments under steady-state conditions. New growth configurations were tested in long growth runs at Westinghouse AESD which produced wider, lower stress and higher quality web crystals than designs previously used. Author

N83-27354# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
THE SIMULATION OF A PASSIVE SOLAR ENERGY SYSTEM M.S. Thesis
Mitchell Perry Slate Dec. 1982 114 p refs
(AD-A124900; AFIT/GA/AA/82D-8) Avail: NTIS HC A06/MF A01 CSCL 11/4

A simple lumped capacitance-resistance model is used to simulate heat flow in a residential size structure heated passively by the sun. The model takes the form of an analogous electrical circuit. A computer program was written to analyse the circuit. By altering the input parameters of the program, the thermal performance of a wide variety of passive solar designs can be investigated for any geographical location. By comparing program generated data to data taken from experimental test cells in Los Alamos, New Mexico, it was found that the simulation program predicted energy use to within 4 percent of measured values. Also, the computer program predicted temperature swings to within 16 percent of measured swings. Correlation with empirical methods of calculating monthly and annual savings in fuel use for heating was poor. Using the simulation calculations as a base, the predictions of annual savings differed by as much as 76 percent. GRA

N83-27355# AiResearch Mfg. Co., Torrance, Calif.
PHASE 2 BRAYTON/RANKINE 10-TON GAS-FIRED SPACE-CONDITIONING SYSTEM Annual Technical Report
Jul. 1982 105 p refs Sponsored in part by Gas Research Inst.
(Contract W-7405-eng-26)
(DE82-016367; ORNL/sub-80/24706/1; ATR-1) Avail: NTIS HC A06/MF A01

The technical accomplishments to date in the design, development, and demonstration program leading to commercialization of a 10 ton heat actuated space conditioning system for light commercialization of a 10 ton heat actuated space conditioning system for light commercial building applications are summarized. The system consists of a natural gas powered Brayton cycle engine and a Rankine cycle heat pump, combined in a single roof top package. The heat actuated space conditioning system provides more efficient use of natural gas and is intended as an all gas alternative to the electric heat pump. The system employs a subatmospheric natural gas fired heat pump. A centrifugal R-12 refrigerant compressor is driven directly from the Brayton engine rotating group through a hermetically sealed coupling. Unique features that offer high life cycle performance include a permanent magnet coupling, foil bearings, an atmospheric in-line combustor, and a high temperature recuperator. DOE

N83-27356# Purdue Univ., Lafayette, Ind. Combustion Lab.
KINETIC MECHANISM FOR FUEL-NITROGEN CONVERSION IN LEAN TO RICH FLAMES
Richard C. Peterson and Normand M. Laurendeau 1982 546 p refs Presented at the Spring Tech. Meeting of the Central States Section of the Combust. Inst., Columbus, Ohio, 22-23 Mar. 1982
(DE82-905467; CONF-830320; CSS/CI-82-15) Avail: NTIS HC A23/MF A01

The 1982 Spring Technical Meeting of Central States Section of the Combustion institute was held on March 22-23, 1982, at The Ohio State University, Columbus, OH. The title of the Symposium was The Use of High-Sulfur Coal: Combustion, Gasification, and Control of Emissions (notably SO2). There are some particularly good papers on the air pollution abatement of nitrogen oxides. Twenty-two papers have been entered individually into EDB and ERA; two papers (Nos. 11 and 17) were processed earlier. DOE

N83-27357# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.

TRANSPARENT HEAT-MIRROR MATERIALS AND DEPOSITION TECHNOLOGY

Carl M. Lampert, comp. and Stephen Selkowitz, comp. Jul. 1982 115 p refs Proc. of the Conf. on Opt. Coatings for Energy Efficiency and Solar Appl. and the Conf. on Opt. Thin Films, Los Angeles, 25-29 Jan. 1982; sponsored by the Society for Optical Engineering

(Contract DE-AC03-76SF-00098)

(DE83-007042; LBL-15258) Avail: NTIS HC A06/MF A01

Advanced solar optical films and heat-mirror materials, properties of heat mirrors on glass substrates, properties of heat-mirrors on polymeric substrates, and large-scale processing technology are discussed. For individual titles, see N83-27358 through N83-27371.

N83-27358# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.

DURABLE INNOVATIVE SOLAR OPTICAL MATERIALS: THE INTERNATIONAL CHALLENGE

Carl M. Lampert *In its* Transparent Heat-Mirror Mater. and Deposition Technol. Jul. 1982 p 1-8 refs (For primary document see N83-27357 16-44)

(Contract W-7405-eng-48)

Avail: NTIS HC A06/MF A01

A variety of optical coatings is discussed in the context of solar energy utilization. Well known coatings such as heat mirrors, selective absorbers, and reflective films are covered briefly. Emphasis is placed on the materials limitations and design choices for various lesser known optical coatings and materials. Physical and optical properties are detailed for protective antireflection films, fluorescent concentrator materials, holographic films, cold mirrors, radiative cooling surfaces, and optical switching films including electrochromic, thermochromic, photochromic, and liquid crystal types. For many of these materials research is only now being considered, and various design and durability issues must be addressed. Author

N83-27359# Leybold-Heraeus G.m.b.H., Hanau/Main (West Germany). Dept. of Large-Scale Coating Systems.

LOW EMISSIVITY AND SOLAR CONTROL COATINGS ON ARCHITECTURAL GLASS

Wolf-Dieter Dachselt, Wolf-Dieter Munz, and Michael Scherer *In* Lawrence Berkeley Lab. Transparent Heat-Mirror Mater. and Deposition Technol. Jul. 1982 p 9-16 refs (For primary document see N83-27357 16-44)

Avail: NTIS HC A06/MF A01

Methods of depositing thin films on glass using the vacuum coating technic were developed to impede the transfer of heat through glass thus reducing the energy costs for room heating or air conditioning. Heat reflecting so-called low emissivity coatings permit a maximum amount of daylight to pass through, but then block the heat that is generated when light strikes an object (greenhouse effect). They are composed of metals like silver or copper sandwiched in selected oxide films or they are transparent semi-conducting monofilms. Double glazed insulating units with coated glass achieve k-values in the order of magnitude 1.8 to 1.5 Watts per squaremeters and degree Kelvin. Maximum available transmittance values at lambda - 550 nm are 85% (single pane), maximum reflectance values are 93% measured at lambda = 8 microns. The corresponding emissivities are around 0.1. The investigated low-e films are stable within 1% concerning transmittance and sheet resistance changes when exposed to elevated temperatures in air of up to 150 C. Solar control films used to keep out sunheat are sputtered in a reactive gas atmosphere on the base of titanium, stainless steel or chromium. Reflectance values of 32% are achieved at a transmission of e.g. 8%. The shading coefficient b is about 0.27. Large-scale production equipment for sputter deposition of the cited films is introduced. Author

N83-27360# American Cyanamid Co., Stamford, Conn. Chemical Research Div.

MATERIALS FOR TRANSPARENT HEAT MIRROR COATINGS

G. Haacke *In* Lawrence Berkeley Lab. Transparent Heat-Mirror Mater. and Deposition Technol. Jul. 1982 p 17-22 refs (For primary document see N83-27357 16-44)

Avail: NTIS HC A06/MF A01

Transparent heat mirrors can be constructed from single- or multi-layer coatings. For single-layer mirrors wide-band-gap semiconductors are the best available materials. The required fundamental semiconductor properties are reviewed and experimental data of binary and ternary compounds discussed. Author

N83-27361# Uppsala Univ. (Sweden). Dept. of Solid State Physics.

OPTICAL PROPERTIES OF TRANSPARENT HEAT MIRRORS BASED ON THIN FILMS OF TiN, ZrN, AND HfN

Bjoern Karlsson and Carl G. Ribbing *In* Lawrence Berkeley Lab. Transparent Heat-Mirror Mater. and Deposition Technol. Jul. 1982 p 23-28 refs (For primary document see N83-27357 16-44)

Avail: NTIS HC A06/MF A01

Calculations of the transmittance and reflectance between 0.35 microns and 10 microns of semitransparent films of TiN, ZrN and HfN were performed. The calculations are based on recently reported optical constants. They show that these compounds can be used as transparent heat-mirrors. These materials show considerable higher emittance than he noble-metals but comparable or higher visible transmittance. It is also shown that the transmittance can be increased by the technique of induced transmission. Author

N83-27362# Philips G.m.b.H., Aachen (West Germany).

TRANSPARENT HEAT REFLECTING COATINGS (THRC) BASED ON HIGHLY DOPED TIN OXIDE AND INDIUM OXIDE

G. Frank, E. Kauer, H. Koestlin, and F. J. Schmitte (Technische Hochschule, Aachen, West Germany) *In* Lawrence Berkeley Lab. Transparent Heat-Mirror Mater. and Deposition Technol. Jul. 1982 p 29-38 refs (For primary document see N83-27357 16-44)

Avail: NTIS HC A06/MF A01

A number of highly doped oxides, in particular SnO2 and In2O3, were reported to show high infrared reflectivity while being transparent to visible radiation. Their optical behavior is based on metal-like properties i.e., high concentration and mobility of the conduction electrons and a semionductor bandgap of about 3 eV or higher. Thin films of these oxides can be adapted for many applications and a feww examples will be described. The performance of these filters strongly depends on the doping and preparation conditions. Coatings prepared by spray pyrolysis show excellent electrical and optical properties, the upper limits of which are being discussed on the basis of defect mechanisms in solids. Author

N83-27363# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Physics.

HIGH QUALITY TRANSPARENT HEAT RELFECTORS OF REACTIVELY EVAPORATED INDIUM TIN OXIDE

I. Hamberg, A. Hjortsberg, and C. G. Granqvist *In* Lawrence Berkeley Lab. Transparent Heat-Mirror Mater. and Deposition Technol. Jul. 1982 p 39-44 refs (For primary document see N83-27357 16-44)

Avail: NTIS HC A06/MF A01

Transparent and heat-reflecting Indium-Tin-Oxide (ITO) films prepared by well controlled reactive electron-beam evaporation of In2O3 + 9 mol.% SnO2 onto glass in approx. 300 C were: visile light absorptance < or approx. 2%, thermal infrared reflectance > or approx. 90%, and dc resistivity < or approx. 3 x .0002 ohm cm. Similar properties were found for substrate temperatures down to 150 C, whereas a rapid deterioration cook place at still lower temperatures. After antireflection coating with approx. 0.1 micron of evaporated MgF2, the visible transmittance became larger than that of the uncoated glass, while the infrared reflectance increased

by a few percent only. The ITO + MgF2 coatings show much weaker irridescence than the bare ITO films. Author

N83-27364# Loughborough Univ. of Technology (England). Dept. of Physics.
HEAT MIRRORS ON PLASTIC SHEET USING TRANSPARENT OXIDE CONDUCTING COATINGS
Ronald P. Howson and Martin I. Ridge *In* Lawrence Berkeley Lab. Transparent Heat-Mirror Mater. and Deposition Technol. Jul. 1982 p 45-52 refs (For primary document see N83-27357 16-44)
Avail: NTIS HC A06/MF A01

A technique of reactive dc magnetron sputtering with RF substrate bias was evolved to give metal oxide films which exhibit heat reflecting properties while remaining highly transparent. Films or indium-tin, indium and cadmium-tin oxide were were deposited onto plastic sheet at room temperature at rates of greater than 0.5 microns min. Preliminary assessments of durability with accelerated weathering with exposure to high U.V. levels and high humidities gave very encouraging results. The properties achieved with a single coating of about 300 nm of oxide to a 50 microns thick P.E.T. sheet are visible transmittances of over 70% with heat emissivities lower than 0.3. These properties are commensurate with them providing an energy and cost effective addition to new and existing windows. Author

N83-27365# Teijin Ltd., Tokyo (Japan). Central Research Labs.
TRANSPARENT HEAT INSULATING COATINGS ON A POLYESTER FILM
Kyoshi Chiba, Shigenobu Sobajima, Utarni Yonamura, and Nobuo Suzuki *In* Lawrence Berkeley Lab. Transparent Heat-Mirror Mater. and Deposition Technol. Jul. 1982 p 53-60 refs (For primary document see N83-27357 16-44)
Avail: NTIS HC A06/MF A01

Multi-layer coatings of metal-dielectric type were prepared on a poly(ethylene terephthalate) (PET) film using chemical and physical preparation techniques. Hydrolysis of tetrabutyl titanate (TBT) followed by condensation gave rise to well-controlled transparent dielectric layers with relatively high refractive index and a silver layer was prepared by vacuum evaporation. Changes of chemical condition gave various types of optical characteristics. This film reduces energy dissipation from a single windowpane by around 35%. Author

N83-27366# Leybold-Heraeus G.m.b.H., Hanau/Main (West Germany). Dept. of Research and Development for Coating.
PERFORMANCE AND SPUTTERING CRITERIA OF MODERN ARCHITECTURAL GLASS COATINGS
Wolf-Dieter Nunz and Stefan R. Reineck *In* Lawrence Berkeley Lab. Transparent Heat-Mirror Mater. and Deposition Technol. Jul. 1982 p 61-70 refs Sponsored by Bundesministerium fuer Forschung und Technologie (For primary document see N83-27357 16-44)
Avail: NTIS HC A06/MF A01

The specific requirements to the magnetron cathode to reach special film properties are described. For the solar control films a low magnetic field strength version of the magnetron cathode is used to improve film hardness. For the heat mirror coatings a high magnetic field strength version of the magnetron cathode is described, especially to prevent the oxidation of IR-reflecting intermediate metal film. Optical values of solar control films on the base of stainless steel and titanium are given. Special color effects, especially in reflection are described. Heat mirrors are exhibited as three films systems with silver or copper as the intermediate metal films. Transmission and reflectivity values are reported. Author

N83-27367# Airco Temesal, Berkeley, Calif.
PRODUCTION TECHNIQUES FOR HIGH VOLUME SPUTTERED FILMS
Albany D. Grubb, Thomas S. Mosakowski, and Walter G. Overacker *In* Lawrence Berkeley Lab. Transparent Heat-Mirror Mater. and Deposition Technol. Jul. 1982 p 71-78 (For primary document see N83-27357 16-44)
Avail: NTIS HC A06/MF A01

Production techniques were developed and proven in a production facility owned and operated by Airco Temescal in Carleton, Michigan. This plant deposits single and multilayer films by sputtering on glass for architectural applications. Other plants have been built for handling glass substrates up to 100 inches wide to 144 inches long with average line speeds up to 12 feet per minute. This proven technology is applicable to the manufacture of other products, such as mirrors and glass with conductive coatings in large quantities. Author

N83-27368# Watkins-Johnson Co., Scotts Valley, Calif.
OPTICAL COATINGS BY CONVEYORIZED ATMOSPHERIC CHEMICAL VAPOR DEPOSITION (CVD)
Nicholas M. Gralenski *In* Lawrence Berkeley Lab. Transparent Heat-Mirror Mater. and Deposition Technol. Jul. 1982 p 79-98 refs (For primary document see N83-27357 16-44)
Avail: NTIS HC A06/MF A01

Chemical vapor deposition (CVD) by liquid spray, a thick film conveyor furnace, and conveyorized atmospheric pressure CVD design are discussed. Author

N83-27369# Leybold-Heraeus G.m.b.H., Hanau/Main (West Germany). Roll Coating Div.
VACUUM ROLL COATING EQUIPMENT
Ernst K. Hartwig *In* Lawrence Berkeley Lab. Transparent Heat-Mirror Mater. and Deposition Technol. Jul. 1982 p 99-108 (For primary document see N83-27357 16-44)
Avail: NTIS HC A06/MF A01

Vacuum roll coating equipment is built for an increasingly large number of different products for various applications. A variety of technical solutions with regard to the main functional construction groups allow the coating equipment to be taylored according to the given requirements of special products. With a system of interchangeable groups it is possible to compose specialized vacuum roll coating equipment. Author

N83-27370# Sierracin/Intrex Products, Chatsworth, Calif.
CONTINUOUS COATING OF INDIUM TIN OXIDE ONTO LARGE AREA FLEXIBLE SUBSTRATES
W. C. Kittler, Jr. and I. T. Ritchie *In* Lawrence Berkeley Lab. Transparent Heat-Mirror Mater. and Deposition Technol. Jul. 1982 p 109-112 refs (For primary document see N83-27357 16-44)
Avail: NTIS HC A06/MF A01

A process is described for the continuous coating of rolls of flexible material up to 36' wide with a transparent electrically conductive layer of indium tin oxide. These coatings are produced by either direct sputtering or by reactive magnetron sputtering from a metal alloy target. The latter process is preferred from a cost standpoint. Coatings are available with visible light transmittances and electrical resistances ranging from greater than 0.8 and less than 100 ohms/sigma to 0.9 and greater than 1M ohms/sigma respectively. A variety of substrates, such as polyester, Teflon, Kapton, polycarbonate can be coated. Uses of these coatings range from use in transparent touch panels to static drains and heat mirrors. Several of these applications are discussed briefly. Author

N83-27371# Loughborough Univ. of Technology (England). Dept. of Physics.
NEW TECHNIQUES FOR ROLL COATING OF OPTICAL THIN FILM
Martin I. Ridge, Ronald P. Howson, and Charles A. Bishop *In* Lawrence Berkeley Lab. Transparent Heat-Mirror Mater. and Deposition Technol. Jul. 1982 p 113-118 refs (For primary document see N83-27357 16-44)
Avail: NTIS HC A06/MF A01

Methods of deposition were developed which are adapted for the vacuum roll-to-roll coating of plastic with optical thin films. Planar magnetron sputtering and low pressure plasma assisted CAD are shown to be peculiarly fitted for this application. The construction of such an apparatus is described and examples of

indium and indium-tin oxide films made by these techniques are given. Author

N83-27372# Atlas Corp., Santa Cruz, Calif.
PROCEEDINGS OF THE SIXTH ANNUAL GEOTHERMAL CONFERENCE AND WORKSHOP
Dec. 1982 278 p refs Conf. held in Snowbird, Utah, 28 Jun. 1 Jul. 1982 Prepared by EPRI
(EPRI Proj. WS-82-118)
(DE83-901135; EPRI-AP-2760) Avail: NTIS HC A13/MF A01

Geothermal research projects, utility projects and plans are presented. A worldwide view of geothermal power development experience is included as well as accounts of discussions which focused on the theme of Shortening the Time to Power on Line For individual titles, see N83-27373 through N83-27380.

N83-27373# Houston Lighting and Power Co., Tex.
UTILITY GEOTHERMAL PLANS, TEXAS AND LOUISIANA
John R. Ridgway, Jr. *In* Atlas Corp. Proc. of the 6th Ann. Geothermal Conf. and Workshop Dec. 1982 3 p (For primary document see N83-27372 16-44)
Avail: NTIS HC A13/MF A01

The best opportunity for geothermal energy recovery seems to be the geopressured aquifer system which extends under the Louisiana and Texas Gulf Coast. To learn more of these formations and their contents which have been responsible for most of the blowouts in petroleum wells while drilling to 12,000 feet and greater depths, design wells are used. Design wells are wells which are designed and drilled specifically for the purpose of testing the geopressured aquifers. The status of four design wells, are reported. S.L.

N83-27374# California Dept. of Water Resources, Sacramento.
GEOTHERMAL ENERGY AND THE STATE WATER PROJECT
Henry Struckmeyer and Bruce Johnson *In* Atlas Corp. Proc. of the 6th Ann. Geothermal Conf. and Workshop Dec. 1982 5 p (For primary document see N83-27372 16-44)
Avail: NTIS HC A13/MF A01

The geothermal program is a small but very important part of the overall energy program. Through actual efforts in developing generating facilities, the true costs, problems and values are learned. The overall position in the geothermal arena is determined. Geothermal energy development activities are discussed. S.L.

N83-27375# San Diego Gas and Electric Co., Calif.
HEBER BINARY PROJECT. BINARY CYCLE GEOTHERMAL DEMONSTRATION POWER PLANT (RP1900-1)
Robert G. Lacy and Tiffany T. Nelson *In* Atlas Corp. Proc. of the 6th Ann. Geothermal Conf. and Workshop Dec. 1982 7 p (For primary document see N83-27372 16-44)
Avail: NTIS HC A13/MF A01

The Heber Binary Project (1) demonstrates the potential of moderate temperature (below 410 F) geothermal energy to produce economic electric power with binary cycle conversion technology; (2) allows the scaling up and evaluation of the performance of binary cycle technology in geothermal service; (3) establishes schedule, cost and equipment performance, reservoir performance, and the environmental acceptability of such plants; and (4) resolves uncertainties associated with the reservoir performance, plant operation, and economics. S.L.

N83-27376# Biphase Energy Systems, Inc., Santa Monica, Calif.
WELLHEAD POWER PRODUCTION WITH A ROTARY SEPARATOR TURBINE (RP 1196)
D. J. Cerini and J. Record *In* Atlas Corp. Proc. of the 6th Ann. Geothermal Conf. and Workshop Dec. 1982 7 p refs (For primary document see N83-27372 16-44)
Avail: NTIS HC A13/MF A01

A rotary-separator turbine was built with full flow capacity for a 500 F downhole temperature with a 850,000 lbm/hr production rate. The test system and results obtained in field tests are described. The preliminary design of a 10-megawatt wellhead power plant for the Roosevelt type resource is described. This system shows a specific power of .0013 kW hr per lbm, which is 20 percent greater than an optimized wellhead single stage flash plant. This is 26 percent greater than a central plant of 20 to 50 MW capacity when consideration is given to steam-gathering system pressure drop between the wells and central plant. S.L.

N83-27377# Bechtel Corp., San Francisco, Calif.
GEOTHERMAL STEAM SEPARATOR EVALUATION (RP1672-1)
Leon Awerbuch, Victor C. VanderMast, and David P. McGrath *In* Atlas Corp. Proc. of the 6th Ann. Geothermal Conf. and Workshop Dec. 1982 15 p refs (For primary document see N83-27372 16-44)
Avail: NTIS HC A13/MF A01

The performance of a two stage separation system using a primary phase separator and final moisture removal device was determined. The primary phase separator was a bottom outlet cyclone, T-1, and the final moisture removal device was either a hook and vane, D-1, or a wire mesh pad, alpha-2, both in vessel T-2. The BOC performance was determined for steam purity (or removal efficiency) and pressure drop using the following primary test parameters: inlet vapor velocity, brine flow rate, brine level in BOC, and flashdown pressure. The steam purity is defined as the total dissolved solids in the steam. S.L.

N83-27378# Bechtel Corp., San Francisco, Calif.
GEOTHERMAL SCALE CONTROL BY CRYSTALLIZATION (RP1525-2)
Leon Awerbuch, Victor C. VanderMast, and A. N. Rogers *In* Atlas Corp. Proc. of the 6th Ann. Geothermal Conf. and Workshop Dec. 1982 15 p refs (For primary document see N83-27372 16-44)
Avail: NTIS HC A13/MF A01

A simple, straightforward process and equipment for the control of all types of scale was developed. The process is based on the well known slurry seeding technique. The seeding and slurry settling steps are conducted in two flasher crystallizer separators which are described. These effect the prompt contacting of brine with a large number of seed crystals at the instant of flashing. S.L.

N83-27379# University of Southeastern Massachusetts, North Dartmouth. Dept. of Mechanical Engineering.
OVERVIEW OF WORLDWIDE GEOTHERMAL POWER DEVELOPMENT
Ronald DiPippo *In* Atlas Corp. Proc. of the 6th Ann. Geothermal Conf. and Workshop Dec. 1982 12 p refs (For primary document see N83-27372 16-44)
Avail: NTIS HC A13/MF A01

The progress in geothermal power plant development around the world is reviewed. From an installed capacity of about 150 MW, the worldwide geothermal electric capacity now stands at roughly 2550 MW. The status of geothermal installed capacity is given. Over 120 individual power units (i.e., turbo-generator sets) are now in operation. It is interesting to note that one third of these are in Italy, the country that began the commercial generation of electricity from geothermal energy. The recent growth pattern is shown. These has been an increase of 45%, and the installed capacity is expected to exceed 4400 MW, a 150% increase. S.L.

N83-27380# Mitsubishi Heavy-Industries Ltd., Nagasaki (Japan). Land Turbine Designing Section.
SMALL GEOTHERMAL POWER PLANT. PORTABLE TURBINE GENERATOR
Naoki Nakamura *In* Atlas Corp. Proc. of the 6th Ann. Geothermal Conf. and Workshop Dec. 1982 4 p (For primary document see N83-27372 16-44)
Avail: NTIS HC A13/MF A01

The initial cost of geothermal power plant per kW output electricity will generally increase if the unit becomes smaller. In order to encourage the utilization of small geothermal energy, the low initial cost equipments must be developed. The small geothermal power plant equipment shall be delivered in short time, transported easily, and installed in short periods. Geothermal portable turbine generator meets these requirements. Therefore,

this is suitable for the power generation in the area with small electric power demand such as small islands and isolated area.
Author

N83-27381*# Westinghouse Electric Corp., Pittsburgh, Pa. Advanced Energy Systems Div.
PROCESS RESEARCH ON NON-CZ SILICON MATERIAL Quarterly Report, 1 Jun. - 31 Aug. 1982
1982 32 p refs
(Contract JPL-955909)
(NASA-CR-172684; NAS 1.26:172684; DOE/JPL-955909-82/8; DE82-022490; QR-2) Avail: NTIS HC A03/MF A01 CSCL 10A

High risk, high payoff research areas associated with he process for producing photovoltaic modules using non-CZ sheet material are investigated. All investigations are being performed using dendritic web silicon, but all processes are directly applicable to other ribbon forms of sheet material. The technical feasibility of forming front and back junctions in non-CZ silicon using liquid dopant techniques was determined. Numerous commercially available liquid phosphorus and boron dopant solutions are investigated. Temperature-time profiles to achieve N(+) and P(+) sheet resistivities of 60 + or - 10 and 40 + or - s10 ohms per square centimeter respectively are established. A study of the optimal method of liquid dopant application is performed. The technical feasibility of forming a liquid applied diffusion mask to replace the more costly chemical vapor deposited SiO2 diffusion mask was also determined. DOE

N83-27382# Pacific Northwest Lab., Richland, Wash.
AQUIFER THERMAL-ENERGY-STORAGE COSTS WITH A SEASONAL-CHILL SOURCE
D. R. Brown Jan. 1983 65 p refs
(Contract DE-AC06-76RL-01830)
(DE83-006700; PNL-4587) Avail: NTIS HC A04/MF A01

The cost of energy supplied by an aquifer thermal energy storage (ATES) ystem from a seasonal chill source was investigated. Costs were estimated for point demand and residential development ATES systems using the computer code AQUASTOR. AQUASTOR was developed at PNL specifically for the economic analysis of ATES systems. In this analysis the cost effect of varying a wide range of technical and economic parameters was examined. Those parameters exhibiting a substantial influence on the costs of ATES delivered chill were: system size; well flow rate; transmission distance; source temperature; well depth; and cost of capital. The effects of each parameter are discussed. Two primary constraints of ATES chill systems are the extremely low energy density of the storage fluid and the prohibitive costs of lengthly pipelines for delivering chill to residential users. This economic analysis concludes that ATES-delivered chill will not be competitive for residential cooling applications. The otherwise marginal attractiveness of ATES chill systems vanishes under the extremely low load factors characteristic of residential cooling systems. DOE

N83-27383# Pacific Northwest Lab., Richland, Wash.
A NEW LOOK AT TURBULENCE EXPERIENCED BY A ROTATING WIND TURBINE
J. R. Connell and R. L. George Aug. 1982 31 p refs Presented at the ASME Wind Energy Symp., Houston, Tex., 30 Jan. - 3 Feb. 1983
(Contract DE-AC06-76RL-01830)
(DE83-007044; PNL-SA-10653; CONF-830108-3) Avail: NTIS HC A03/MF A01

It is demonstrated that the wind that drives a wind turbine is correctly characterized only if the basic time series of wind is obtained by rotationally sampling the wind around the disc of the rotor. The approach taken to characterize the rotationally sampled wind is described, and a set of simpler approximations are compared to the full rotationally sampled wind at a vertical plane array of anemometers. The spectrum of rotationally sampled wind measured in the wake of a 200 kW MOD 0A1 wind turbine and the importance of rotationally analyzing the wind before calculating probability density distributions of gust amplitudes are shown. A theoretical model of the spectrum of the rotationally sampled wind is compared with an observed spectrum from the rotationally sampled wind at the vertical plane array of anemometers. DOE

N83-27384# Rockwell International Corp., Golden, Colo.
WIND-SYSTEMS TECHNICAL NOTES: 1981
S. A. Shuler, comp. and Joel V. Stafford, ed. Mar. 1982 214 p
(Contract DE-AC04-76DP-03533)
(DE83-007202; RFP-3383) Avail: NTIS HC A10/MF A01

Specialized tests of small wind systems and other investigations were compiled. Subjects include: controlled velocity tests, dynamometer tests, failure analysis, design of a digital speed control circuit for induction wind turbine generators and collection of wind turbine generator rpm data via an FM wireless intercom system. DOE

N83-27385# Cornell Univ., Ithaca, N. Y. Dept. of Agricultural Engineering.
THE FEASIBILITY OF BIOGAS PRODUCTION ON FARMS
W. J. Jewell, B. A. Adams, B. P. Eckstrom, K. J. Fanfoni, R. M. Kabrick, and D. F. Sherman Jan. 1982 178 p refs
(Contracts DE-AC02-77CH-00178; DE-AC02-76ET-20051)
(DE83-007385; SERI/PR-9038-1-T1; XB-0-9038-1-10) Avail: NTIS HC A09/MF A01

Biogas technology is reviewed. The following topics are discussed: (1) the potentials and limitations of anaerobic digestion; (2) on site energy generation; (3) relationship of demand to supply; (4) economics of farm scale biogas production; (5) design considerations of the biogas production system; (6) gas utilization; (7) safety guidelines and regulations; and (8) operation, maintenance, and diagnostics of small methane generation systems. GRA

N83-27386# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
CONCEPTUAL DESIGN OF THE TRUSCOTT BRINE LAKE SOLAR POND SYSTEM. VOLUME 2: UTILITY-INTEGRATED SCENARIO
E. Kenneth May, Cecile M. Leboeuf, and David Waddington Dec. 1982 87 p refs
(Contract DE-AC02-77CH-00178)
(DE83-008133; SERI/TR-253-1833-Vol-2) Avail: NTIS HC A05/MF A01

Conceptual designs were developed for salt gradient solar pond systems to provide pumping power for chloride control in the Red River Basin. Energy is extracted from six, 10.5 ha (26 acre) solar ponds for conversion to electricity using three organic Rankine cycle turbines. The solar pond system is located in a brine impoundment lake at Truscott, Texas. Low salinity brine flowing into this lake is concentrated by natural evaporation to form the solar pond, and is also used for solar pond maintenance. Two operating scenarios were investigated. A continuous base load system could deliver 9.8 GWh/yr at an output of 1120 kW to the utility electric grid for an estimated capital expenditure of $12.8 million. A system operating only from June throgh September would cost $21.2 million for an annual energy delivery of 7.7 GWh at a net output during the operating period of 2640 kW. DOE

N83-27387# City of Evanston, Ill.
DEMONSTRATION OF AN A-C UTILITY CONNECTED WIND GENERATOR IN A URBAN SETTING Final Report, Jun. 1979 - Dec. 1982
Alan Kistler, Libby Hill, and Harold Benjamin 31 Jan. 1983 99 p
(Contract DE-FG02-79R5-10109)
(DE83-006696; DOE/R5-10109/1) Avail: NTIS HC A05/MF A01

The goal of the work reported was the visible demonstration of an archetypical small wind machine specifically designed for urban conditions. A concurrent education program about wind machines and their urban potential was to be given for manufacturers, marketers, and consumers. The intent of the project, changes and developments are chronicled, followed by technical appendices and copies of educational and publicity materials.DOE

N83-27388# Carpenter Environmental Associates, Inc., Northvale, N.J.
EXPLORATOR STUDY OF PLASMA ARC JET SHALE CONVERSION
Mar. 1982 144 p
(Contract DE-AC01-80Er-10784)
(DE82-009090; DOE/NBM-2009090) Avail: NTIS HC A07/MF A01

This report discusses the results of our exploratory study, dealing with the use of plasma arc jets in shale conversion. Laboratory experiments are discussed and preliminary dates are presented. Mini net energy analysis and environmental impact analysis are presented within the framework of the very limited amount of information available on the subject. DOE

N83-27389# Sandia Labs., Albuquerque, N. Mex.
PROJECT DEEP STEAM
B. W. Marshall 1982 9 p Presented at the Ann. Heavy Oil Slush EOR Contractors Conf., San Francisco, 27 Jul. 1982
(Contract DE-AC04-76DP-00789)
(DE82-016394; CONF-820712-2) Avail: NTIS HC A02/MF A01

Development of technology for thermally efficient downhole delivery of surface generated steam and for downhole steam generators are the major elements of Project DEEP STEAM. Specific activities include development of advanced concept thermal packers, evaluation of the thermal performance of insulated tubing designs in a test tower and in a field environment, and development of downhole steam generator concepts. Field tests were performed in both technology areas and the results and status are presented. DOE

N83-27390# California Univ., Livermore. Lawrence Livermore Lab.
ENERGY AND TECHNOLOGY REVIEW
Irving F. Stowers, ed., Richard B. Crawford, ed., Mary Ann Esser, ed., Patricia L. Lien, ed., Eleanor ONeal, ed., and Palmer vanDyke, ed. Jul. 1982 58 p refs
(Contract W-7405-eng-48)
(DE82-019880; UCRL-52000-82-7) Avail: NTIS HC A04/MF A01

The state of the laboratory address by LLNL Director Roger Batzel is summarized, and a breakdown of the laboratory funding is given. The Livermore defense related committment is described, including the design and development of advanced nuclear weapons as well as research in inertial confinement fusion, nonnuclear ordnance, and particle beam technology. LLNL is also applying its scientific and engineering resources to the dual challenge of meeting future energy needs without degrading the quality of the biosphere. Some representative examples are given of the supporting groups vital for providing the specialized expertise and new technologies required by the laboratory's major research programs. DOE

N83-27391# Radian Corp., Austin, Tex.
SIMULATED HEAT-EXCHANGER TUBES: DOE GEOTHERMAL TEST FACILITY, EAST MESA, CALIFORNIA
Peter F. Ellis, II and Dennis M. Anliker Nov. 1982 19 p refs
(Contract DE-AC03-81SF-11503)
(DE83-007415; DOE/SF-11503/T2; DCN-82-212-011-42) Avail: NTIS HC A02/MF A01

A 103 hr corrosion test was performed of two geothermal heat exchanger materials, Allegheny-Ludlum Alloy 29-4 and Alloy 29-4C. Coupons of the two metals were exposed under conditions simulating flow in a geothermal heat exchanger tube. Continuous flow and cyclic exposure tests were made. No signs of localized corrosion were observed in either the base metal, tube weld seam, or heat affected zone. Most coupons show statistically insignificant weight change. A corrosion rate of less than 0.5 mil/yr is indicated. No significant difference in the performance of the two alloys is reported. DOE

N83-27392# Tufts Univ., Medford, Mass.
LOW-COST, SPRAYED CdTe SOLAR-CELL RESEARCH Final Report
M. R. Squillante, R. Turcotte, G. Entine, and R. B. Goldner Dec. 1982 66 p refs Prepared for Midwest Research Inst., Golden, Colo.
(Contract DE-AC02-77CH-00178)
(DE83-007275; SERI/TR-8104-3-T4;) Avail: NTIS HC A04/MF A01

Techniques to deposit CdTe based solar cells by a spray pyrolysis process called reductive multichemical deposition (RMD) were examined. The principles of the process and the major results obtained during the program are appended. Results of electrical testing performed on films and devices are presented, and the experiments performed on the CdS layer are discussed. Improvement of the quality of the CdS layer, the CdS surface CdS/CdTe interface is crucial in increasing device performance. Films of CuIn Se2 were spray deposited to investigate further the potential power of the RMD process. DOE

N83-27393# Battelle Pacific Northwest Labs., Richland, Wash.
SITING GUIDELINES FOR UTILITY APPLICATION OF WIND TURBINES Final Report
W. T. Pennell Jan. 1983 263 p refs Sponsored by EPRI
(EPRI Proj. 1520-1)
(DE83-007428; EPRI-AP-2795) Avail: NTIS HC A12/MF A01

Utility oriented guidelines are described for identifying viable sites for wind turbines. Topics and procedures are also discussed that are important in carrying out a wind turbine siting program. These topics include: a description of the Department of Energy wind resource atlases; procedures for predicting wind turbine performance at potential sites; methods for analyzing wind turbine economics; procedures for estimating installation and maintenance costs; methods for analyzing the distribution of wind resources over an area; and instrumentation for documenting wind behavior at potential sites. The procedure described is applicable to small and large utilities. Although the procedure was developed as a site selection tool, it can also be used by a utility who wishes to estimate the potential for wind turbine penetration into its future generation mix. DOE

N83-27394# Pacific Northwest Lab., Richland, Wash.
OPERATIONS REQUIREMENTS OF UTILITIES WITH WIND-POWER GENERATION
David C. Powell, S. M. Chan, M. Yoshimura, and D. H. Curtice Nov. 1982 11 p refs Presented at the IEEE Power Eng. Soc. Winter Meeting, New York, 31 Jan. 1983 Prepared in cooperation with Systems Control, Inc., Palo Alto, Calif.
(Contract DE-AC06-76RL-01830)
(DE83-007051; PNL-SA-10890; CONF-830107-3) Avail: NTIS HC A02/MF A01

A computational method and the necessary wind speed data are presented in this paper for quantifying in a probabilistic framework the load following, operating reserve and unloadable generation requirements for a utility with one or more spatially dispersed wind turbine clusters. Results of this method are valid for random atmospheric conditions, excluding significant atmospheric events such as storm fronts. An example illustrating the proposed method is included. DOE

N83-27395# Sandia Labs., Albuquerque, N. Mex. Geo Energy Technology Dept.
GEO ENERGY RESEARCH AND DEVELOPMENT: TECHNOLOGY TRANSFER UPDATE
Richard K. Traeger and Virgil I. Dugan Jan. 1983 47 p refs
(Contract DE-AC04-76DP-00789)
(DE83-007225; SAND-83-0018) Avail: NTIS HC A03/MF A01

Sandia Geo Energy Programs in geothermal, coal, oil and gas, and synfuel technologies have been effective in transferring research concepts to applications in private industry. This report updates the previous summary (SAND82-0211, March 1982) to include recent technology transfers and to reflect recent changes in philosophy on technology transfer. Over 40 items transferred to industry have been identified in the areas of Hardware, Risk Removal and Understanding. Successful transfer is due largely to

personal interactions between Sandia engineers and the technical staffs of private industry. DOE

N83-27396# Ames Lab., Iowa. Dept. of Materials Science and Engineering.
THE RARE EARTH SULFIDES R2S/SUB 3-X/(R = Sc, Er AND Lu) AS HIGH TEMPERATURE THERMOELECTRIC ELEMENTS
T. Takeshita, B. J. Beaudry, and K. A. Gschneider, Jr. 1982 4 p refs Presented at the 4th Intern. Conf. on Thermoelec. Energy Conversion, Arlington, Tex., 10 Mar. 1982
(Contract W-7405-eng-82)
(DE82-016382; IS-M-376; CONF-820379-1) Avail: NTIS HC A02/MF A01

Rare earth sesquisulfides, Sc2S/sub 3-x/, Er2S/sub 3-x/ and Lu2S/sub 3-x/ were studied with respect to their thermoelectric power and electrical resistivity. All sulfides were shown to be n-type conductors: Sc2S/sub 3-x/ (alpha = 170 micro v C,p = .00356 OMEGA.cm), Er2S/sub 3-x/ (alpha = 530 micro v/C, p = 312 OMEGA.cm) and Lu2S/sub 3-x/ (a = 41 micro v/C, p = 50.6 OMEGA.cm) at 500 C. DOE

N83-27397# Lincoln Lab., Mass. Inst. of Tech., Lexington.
DATA REPORT FOR THE NORTHEAST RESIDENTIAL EXPERIMENT STATION, MARCH 1982
M. C. Russell, P. Raghuraman, and P. C. Mahoney Jun. 1982 20 p refs
(Contract DE-AC02-76ET-20279)
(DE82-018134; DOE/ET-20279/209) Avail: NTIS HC A02/MF A01

Physical performance data for the month of March 1982 obtained from photovoltaic energy systems under test at the Northeast Residential Experiment Station (NE RES) in Concord, Massachusetts are tabulated. Five prototype residential PV systems are under test at the NE RES, each consisting of a roof-mounted array sized to meet at least 50% of the annual electrical demand of the energy-conserving house, and an enclosed structure to house the remainder of the PV system equipment, test instrumentation, and work space. Each prototype system is grid connected. The data tables include a one-page summary, detailed hour-by-hour information for an average day of the month, including monitored house and prototype systems data, and present the hypothetical energy exchange if each prototype system supplied energy to each monitored house. Also included are a graph of the hypothetical energy flow data and monthly load duration curves. DOE

N83-27398# New Mexico State Univ., Las Cruces.
DATA REPORT FOR THE SOUTHWEST RESIDENTIAL EXPERIMENT STATION, FEBRUARY 1982
M. Lieberman, O. Y. Hai, G. Hocking, and C. Whitaker 26 Apr. 1982 25 p refs Prepared in cooperation with Lincoln Lab., Massachusetts Inst. of Technology, Lexington
(Contract DE-AC02-76ET-20279)
(DE82-016330; DOE/ET-20279/196) Avail: NTIS HC A02/MF A01

Tabulated are physical performance data obtained from the photovoltaic energy systems under test at the Southwest Residential Experiment Station (SW RES) in Las Cruces, New Mexico for the month of February 1982. A one-page data summary is included as well as a more detailed hourly tabulation for an average day of the month. Energy histograms are provided for each prototype system. The histograms also present horizontal and plane-of-array insolation data as well as comments that explain data and/or energy production anomalies. Eight prototype residential PV systems are under test, each consisting of a roof-mounted PV array sized to meet at least 50% of the annual electric demand of an energy-conserving house, and an enclosed structure to house the remainder of the PV system equipment, test instrumentation, and work space. All systems are grid-connected. DOE

N83-27399# Lincoln Lab., Mass. Inst. of Tech., Lexington.
RESIDENTIAL PHOTOVOLTAIC SYSTEM SIMULATION: THERMAL ASPECTS
G. W. Hart and P. Raghuraman 1982 9 p refs Presented at the ASME Solar Energy Conf., Albuquerque, N. Mex., 26 Apr. 1982
(Contract DE-AC02-76ET-20279)
(DE82-007784; DOE/ET-20279/183; CONF-820410-7) Avail: NTIS HC A02/MF A01

A TRNSYS simulation was developed to simulate the performance of utility interactive residential photovoltaic energy systems. The PV system is divided into its major functional components, which are individually described with computer models. These models are described in detail. The results of simulation and actual measured data obtained a MIT Lincoln Laboratory's Northeast Residential Station are compared. The thermal influences on the design of such photovoltaic energy systems are given particular attention. DOE

N83-27400# Northeastern Univ., Boston, Mass.
EVAPORATED LITHIUM-DOPED AMORPHOUS SILICON SOLAR CELLS Final Report, 1 Aug. 1979 - 30 Apr. 1982
W. B. Nowak 30 Apr. 1982 37 p
(Contract DE-AC02-79ER-10504)
(DE82-018078; DOE/ER-10504/1-Pt-2) Avail: NTIS HC A03/MF A01

Some thin film silicon solar cells were examined for their atomic and microstructural characteristics. Techniques used for the examinations were: optical microscopy, scanning electron microscopy, transmission electron microscopy, reflection electron diffraction, selected area transmission electron diffraction, and Auger composition profiling. The films were found to be amorphous and featureless with nonuniform thickness. It is found that the sample has a multi-junction nature, that the repeated steps of the evaporation processing have good reproducibility, that the dopant elements do not move around appreciably during the processing, and that the oxygen content is relatively high. There is an unusual correlation between the oxgyen and the antimony concentrations: as the antimony increases the oxygen decreases. DOE

N83-27401# Institute of Gas Technology, Chicago, Ill.
DEVELOPMENT OF A PRESSURIZED FLUIDIZED-BED BIOMASS GASIFIER TO PRODUCE SUBSTITUTE FUELS
S. P. Babu, M. Onischak, and G. Kosowski 1982 12 p refs Presented at the Biomass to Methanol Spec. Workshop, Durango, Colo., 3-5 Mar. 1982
(Contract DE-AC02-80CS-83004)
(DE82-013265; CONF-820324-2) Avail: NTIS HC A02/MF A01

The Institute of Gas technology (IGT) is conducting a program to convert forest and crop residues to substitute fuel in a pressurized fluidized-bed biomass gasifier. The process is designed for operation at pressures up to 2.17 MPa (315 psia) and temperatures up to 1255 K (1800 F). Various goals for synthesis or fuel gas processes are being pursued to develop an efficient process. Some of these goals are to maximize the throughput, the amount, and the quality of the gas, while minimizing both the amount of the feedstock preparation needed and the formation of condensible compounds that require by-product disposal and process wastewater treatment. The process development results obtained from fluidization biomass devolatilization, and char gasification studies were used to design a 30/5-cm (12-inch) ID adiabatic fluidized-bed gasification process development unit (PDU), capable of handling up to 455 kg (1000 lb) of biomass per hour. DOE

N83-27402# Institute of Gas Technology, Chicago, Ill.
HYDROPYROLYSIS OF BIOMASS AND RELATED MATERIALS FOR THE PRODUCTION OF LIQUIDS
William W. Bodle and Kimberly A. Wright 1982 23 p refs Presented at the 6th Ann. Conf. on Energy from Biomass Wastes, Lake Buena Vista, Fla., 25-29 Jan. 1982
(Contract DE-AC01-76ET-10255)
(DE82-012928; CONF-82012-5) Avail: NTIS HC A02/MF A01

Test data for the pyrolytic conversion of eucalyptus wood, leucaena wood, and peat to liquid fuel was analyzed. Charts were developed to facilitate prediction of the quantity and composition

of the various end products as a function of operating conditions such as temperature, pressure, and carrier gas composition. DOE

N83-27403# Shawinigan Engineering Corp., Montreal (Quebec).
INCREASED EFFICIENCY OF HYDROELECTRIC POWER Final Report
D. Creamer and C. F. X. Cadou Jun. 1982 170 p Sponsored by EPRI
(EPRI Proj. 1745-1)
(DE82-905771; EPRI-EM-2407) Avail: NTIS HC A08/MF A01

This report presents the results of a study into the potential for increasing the efficiency of hydroelectric generation at existing plants. The study did not include any direct examination of cost effectiveness. Improvements in efficiency are defined as any cost effective changes which increase the net value of plant output. The study was confined to existing hydroelectric plants with an installed capacity of more than 10 MW, of which there are 518. Data were gathered from FERC and by a questionnaire to plant owners. Improvement of efficiency covered both physical plant improvement and improved operation of plants. Physical improvements dealt with in the study include the uprating of turbines and generators, leakage control and use of flashboards. Operational improvements relate to such matters as the optimum timing of operation and machine loading. The study dealt also with environmental (nonpower) constraints to plant efficiency. DOE

N83-27404# Oak Ridge National Lab., Tenn. Engineering Technology Div.
INTERNATIONAL ENERGY TECHNOLOGY ASSESSMENT: ATMOSPHERIC FLUIDIZED-BED COMBUSTION
R. P. Krishnan and K. O. Johnsson Apr. 1982 399 p
(Contract W-7405-eng-26)
(DE82-012430; ORNL/TM-8033) Avail: NTIS HC A17/MF A01

A survey was made of atmospheric fluidized bed combustion (AFBC) research and development and commercial activities in foreign countries. These activities indicate a broad interest in the process largely because of its flexibility in burning a wide range of coals and low grade fuels. The conclusion is made that AFBC is a viable system and is in the process of being confirmed on a commercial scale for industrial heat and power generation. A number of organizations in the United States and western Europe are offering fluidized bed package boilers, with some form of commercial guarantees. The major uncertainties of the process lie in the areas of coal and sorbent handling systems, availability of reliable construction materials; the system's ability to meet varying load demands; reduced sorbent requirements; and improved carbon utilization. Research and development programs in these areas are being pursued. DOE

N83-27405# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.
RESEARCH STRATEGY TO PERMIT GREATER UTILIZATION OF DOMESTIC FOSSIL ENERGY RESOURCES
Thomas E. OHare Mar. 1982 17 p
(Contract DE-AC02-76CH-00016)
(DE82-018339; BNL-51554) Avail: NTIS HC A02/MF A01

Discussed are 3 approaches taken for developing fossil energy resources: carbon monoxide and synthesis gas; coal-water slurries; and cntrol of ashes. Carbon monoxide and synthesis gas serve as clean multipurpose feedstocks for use as a source of future industrial raw material and fuels. Coal-water slurries are a poor man's synfuel. It makes practical the use of coai in oil-fired utility boilers, industrial heaters, and furnaces. Ash is a deterrent to the use of coal because it is burdensome to dispose of and has serious effects on equipment, the environment, and man. An objective of coal cleaning should be ash removal as well as sulfur. DOE

N83-27406# Mitre Corp., McLean, Va. METREK Div.
FURTHER STUDIES ON DEVELOPING TECHNOLOGY FOR INDIRECT LIQUEFACTION
David Gray, Martin B. Neuworth, and Glen Tomlinson Mar. 1982 126 p refs
(Contract DE-AC01-77ET-10280)
(DE82-017677; DOE/ET-10280/T3; MTR-82W32) Avail: NTIS HC A07/MF A01

Our investigations have resulted in the conclusion that fluidized gasifiers, such as Westinghouse or entrained flow gasifiers such as Texaco and Shell-Koppers offer significant advantages over the BGC Lurgi gasifier when Illinois No. 6 coal is employed as the feedstock. Dry-ash Lurgi gasification has additional disadvantages which appear to make it unsuitable for applications with mildly caking coal such as Illinois No. 6. The results of our analyses of Illinois No. 6 coal do not alter our prior conclusions regarding the use of advanced gasification systems for indirect liquefaction. BGC/Lurgi, Westinghouse, Texaco and Shell-Koppers gasifiers offer significant advantages over dry-ash Lurgi and should be given detailed consideration for a US liquefaction facility. The final decision will probably be driven by the relative state of development at the time a decision is required, process license and guarantees which could be negotiated, the market value of an SNG co-product, and the specific characteristics of the coal feedstock to be used. DOE

N83-27407# Boeing Computer Services, Inc., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE. EXECUTIVE SUMMARY FOR NEWMAN POWER STATION, EL PASO, TEXAS
Jul. 1982 8 p Prepared for Sandia Labs., Albuquerque, N. Mex.
6 Vol.
(Contract DE-AC04-76DP-00789)
(DE82-019965; SAND-81-7100/10) Avail: NTIS HC A02/MF A01

Presented are the data accumulated during April 1982 at the photovoltaic project site at the Newman Power Station, El Paso, Texas. Generated power and environmental (weather) data are presented graphically. Explanations of irregularities not attributable to weather are provided. DOE

N83-27408# Boeing Computer Services, Inc., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE. EXECUTIVE SUMMARY FOR OKLAHOMA CENTER FOR SCIENCE AND ARTS, OKLAHOMA CITY, OKLAHOMA
Jul. 1982 8 p Prepared for Sandia Labs., Albuquerque, N. Mex.
6 Vol.
(Contract DE-AC04-76DP-00789)
(DE82-019964; SAND-81-7101/2) Avail: NTIS HC A02/MF A01

Presented are the data accumulated during April 1982 at the photovoltaic project site at the Oklahoma Center for Science and Arts, Oklahoma City, Oklahoma. Generated power and environmental (weather) data are presented graphically. Explanations of irregularities are attributable to weather are provided. The system was inoperative all month due to a failed power conditioning unit. DOE

N83-27409# Boeing Computer Services, Inc., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE. EXECUTIVE SUMMARY. VOLUME 6: BEVERLY HIGH SCHOOL, BEVERLY, MASSACHUSETTS
Apr. 1982 7 p Prepared for Sandia Labs., Albuquerque, N. Mex.
6 Vol.
(Contract DE-AC04-76DP-00789)
(DE82-015660; SAND-81-7102/6) Avail: NTIS HC A02/MF A01

Performance data are given for a 95 kW-peak grid connected flat panel photovoltaic power supply at a Massachusetts high school for the month of March 1982. Data presented include daily and monthly electrical energy produced by the photovoltaic system, daily and monthly solar energy incident in the plane of the array, efficiency of the solar cell array and of the power conditioner and of the system overall, the capacity factor, solar insolation, and the data acquisition mode and recording interval plot. DOE

N83-27410# Boeing Computer Services, Inc., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE. EXECUTIVE SUMMARY FOR BEVERLY HIGH SCHOOL, BEVERLY, MASSACHUSETTS
Jul. 1982 8 p Prepared for Sandia Labs., Albuquerque, N. Mex. 6 Vol.
(Contract DE-AC04-76DP-00789)
(DE82-019967; SAND-81-7102/7) Avail: NTIS HC A02/MF A01

Presented are the data accumulated during April 1982 at the photovoltaic project site at the Beverly High School, Beverly, Massachusetts. Generated power and environmental (weather) data are presented graphically. Explanations of irregularities not attributable to weather are provided. DOE

N83-27411# Boeing Computer Services, Inc., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE. EXECUTIVE SUMMARY FOR CDC LIGHT MANUFACTURING BUILDING, SAN BERNARDINO, CALIFORNIA
Jul. 1982 8 p Prepared for Sandia Labs., Albuquerque, N. Mex. 6 Vol.
(Contract DE-AC04-76DP-00789)
(DE82-019962; SAND-81-7103/2) Avail: NTIS HC A02/MF A01

Presented are the data accumulated during April 1982 at the photovoltaic project site at the CDC Light Manufacturing Bldg., San Bernardino, California. Generated power and environmental (weather) data are presented graphically. Explanations of irregularities not attributable to weather are provided. DOE

N83-27412# Boeing Computer Services, Inc., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE. EXECUTIVE SUMMARY FOR MISSISSIPPI COUNTY COMMUNITY COLLEGE, BLYTHEVILLE, ARKANSAS
Jul. 1982 8 p Prepared for Sandia Labs., Albuquerque, N. Mex. 6 Vol.
(Contract DE-AC04-76DP-00789)
(DE82-019966; SAND-81-7105/1) Avail: NTIS HC A02/MF A01

Presented are the data accumulated during March 1982 at the photovoltaic combined collector project site at the Mississippi County Community College, Blytheville, Arkansas. Generated power and environmental (weather) data are presented graphically. Explanations of irregularities not attributable to weather are provided. DOE

N83-27413# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
COMPUTER-AIDED ANALYSIS OF ENERGY CONSUMPTION IN ETHANOL-WATER DISTILLATION OPERATIONS
X. N. Nguyen and E. C. Heyman Feb. 1982 28 p refs
(Contracts EG-77-C-01-4042; DE-AC02-77CH-00178)
(DE82-014333; SERI/TR-621-1335) Avail: NTIS HC A03/MF A01

Existing computer programs have been used to evaluate the effects of various process parameters on the energy consumption of an ethanol distillation step. A savings of 250 kJ/mol ethanol produced is possible if the ethanol feed concentration is increased from 4 wt % to 8 wt %; further increases, however, result in only marginal additional savings. Preheating the feed to its saturated liquid condition is more advantageous than distilling the cold feed directly; the reboiler requires substantially less energy if the waste heat in the bottom flow is used to preheat the feed. About $45,000/y could be saved by a 38 ML/y plant by decreasing the operating reflux from 1.5 to 1.3 times the minimum reflux ratio. At ethanol concentrations above 15 wt %, about 40 kJ/mol ethanol produced could be saved by reducing the concentration of the ethanol feed to the dehydrating column to 92 wt %. Operating at 10 kPa (0.1 atm) instead of 100 kPa (1 atm) could save 125 kJ/mol ethanol produced, but an increase in noncondensible gases could lead to increased steam usage. DOE

N83-27414# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
ENGINEERING ANALYSIS OF POTENTIAL PHOTOSYNTHETIC BACTERIAL HYDROGEN-PRODUCTION SYSTEMS
Ann Herlevich and Mike Karpuk Jun. 1982 15 p refs Presented at the SERI Biomass Program Principal Investigators Rev. Meeting, Washington, D.C., 23-25 Jun. 1982
(Contracts EG-77-C-01-4042; DE-AC02-77CH-00178)
(DE82-019151; SERI/TP-235-1548R; CONF-820676-2) Avail: NTIS HC A02/MF A01

Photosynthetic bacteria (PSB) are capable of generating hydrogen from organics in effluents from flod processing, pulp and paper, and chemical and pharmaceutical industries. Hydrogen evolution takes place under light in the absence of air. The rate of hydrogen production is expected to range between 300 to 600 scf of hydrogen per 1000 galloons of waste stream treated per hour. This hydrogen production system has been demonstrated at a bench-scale level and is ready for engineering development. A conceptual design for a PSB hydrogen production system is described. The system is expected to be sited adjacent to a waste stream source which will be pretreated by fermentation and pH adjustment, innoculated with bacteria, and then passed into the reactor. The reactor effluent can either be discharged into a rapid infiltration system, an irrigation ditch, and/or recycled back into the reactor. Several potential reactor designs have been developed, analyzed, and costed. A large covered pond appears to be the most economical design approach. DOE

N83-27415# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
DEVELOPMENT AND APPLICATION OF FULLY-AUTOMATED EBIC TECHNIQUES FOR SOLAR-CELL MEASUREMENTS
P. E. Russell and C. R. Herrington Apr. 1982 15 p refs Presented at the 16th Ann. Microbeam Anal. Soc. Conf., Washington, D.C., 9-13 Aug. 1982
(Contracts EG-77-C-01-4042; DE-AC02-77CH-00178)
(DE82-014409; SERI/TP-213-1593; CONF-820807-2) Avail: NTIS HC A02/MF A01

The electron beam induced current, or EBIC, technique is a powerful tool for the investigation of semiconductor materials and device properties. The technique utilizes a focused electron beam as a source of electron hole pair generation in a well controlled, localized volume. If the sample contains a collecting electrical junction, the short circuit current response to the electron beam can be measured and/or used as intensity modulation for a short circuit current, or EBIC, map. In this work significant improvements to the state of the art in EBIC measurement systems is described. The system developed is totally computer automated and includes such features as beam current regulation and reproducibility, beam blanking, and automated digital data recording, displaying and manipulation. The manual system on which the automation is based will be described first followed by the objectives of automating the system. DOE

N83-27416# Westinghouse Research and Development Center, Pittsburgh, Pa.
DEVELOPMENT OF COPPER SULFIDE/CADMIUM THIN-FILM SOLAR CELLS Technical Progress Report, 1 Jul. - 30 Sep. 1981
J. R. Szedon 18 Mar. 1982 22 p refs
(Contract DE-AC02-77CH-00178)
(DE82-014308; SERI/PR-8143-1-T8; TPR-9) Avail: NTIS HC A02/MF A01

The change in current voltage behavior of thin film Cu2S/CdS cells during aging in wet oxygen can be explained by a tunneling model involving unidentified deep donor sites in the CdS depletion region. This work provides a basis for future efforts to improve the stability of these cells by focusing attention on characterizing a relatively simple mechanism. DOE

N83-27417# Brookhaven National Lab., Upton, N. Y.
THERMAL PERFORMANCE OF A DOUBLE-ENVELOPE HOUSE
G. Dennehy and R. F. Jones 1982 7 p refs Presented at 7th

Natl. Passive Solar Conf., Knoxville, Tenn., 29 Aug. 1982
(Contract DE-AC02-76CH-00016)
(DE82-018061; BNL-31535; CONF-820819-14) Avail: NTIS HC A02/MF A01

An evaluation is made of the thermal performance of a double envelope house of Ekose's design built in Middletown, Rhode Island. Performance monitoring in the heating season showed that the requirements for auxiliary heat are very low, about 2.1 Btu per square foot or floor space per degree day. Design changes are identified which could reduce the heating needs of the house are due primarily to the excellent insulative value of the double shell. DOE

N83-27418# City of Tucson, Ariz.
CITY OF TUCSON SOLAR CODE Final Report
28 May 1982 390 p
(Contract DE-AC02-82CH-10100)
(DE82-016788; DOE/CH-10100/T2) Avail: NTIS HC A17/MF A01

The City of Tucson adopted a Solar Code on April 26, 1982. The process of adoption and implementation of the code is cutlined so that other local governments may benefit from Tucson's experience. A copy of all training materials for the workshop for all building inspection personnel forms the bulk of the report. DOE

N83-27419# Los Alamos Scientific Lab., N. Mex.
ECONOMIC ANALYSIS OF THE INTEGRATED HEATING AND COOLING POTENTIAL OF A RESIDENTIAL PASSIVE-SOLAR WATER WALL DESIGN
F. Roach, C. Mangeng, C. Kirschner, and S. Ben-David 1982 6 p refs Presented at 7th Natl. Solar Conf., Knoxville, Tenn., 29 Aug. 1982 Prepared in cooperation with New Mexico Univ., Albuquerque
(DE82-018372; LA-UR-82-1667; CONF-820819-5) Avail: NTIS HC A02/MF A01

Preliminary performance estimates for the heating and cooling potential of water walls were made. These estimates include the Btu displacement that is attributable to a 300-square foot water wall design in a 1200-square foot residence. The design is for a forced ventalation water wall system that includes the fans and ducting necessary to achieve a 3000-cfm flow of air. The cooling and heating energy displacement estimates are combined with appropriate region-specific fuel prices, system costs, and general economic parameters in a lifecycle cost analysis of this fixed-size water wall design. The economic indicators used to discusse the results include net persent value and a total cost goal. Input data and results are presented in mapped form and used to assess the energy savings potential of the water wall in 220 regions of the continental United States. DOE

N83-27420# Los Alamos Scientific Lab., N. Mex.
VALIDATION OF PASSIVE-SOLAR ANALYSIS/DESIGN TOOLS USING CLASS A PERFORMANCE-EVALUATION DATA
B. D. Hunn, W. V. Turk, and W. O. Wray 1982 7 p refs Presented at 7th Natl. Passive Solar Conf., Knoxville, Tenn., 29 Aug. 1982
(Contract W-7405-eng-36)
(DE82-017588; LA-UR-82-1732; CONF-820819-6) Avail: NTIS HC A02/MF A01

A major objective of the Class A Performance Evaluation Program is to collect, analyze, and archive detailed test data for the rigorous validation of analysis/design tools used for passive solar research and design. Elements of the plan for Class A validation are described. A proposed validation methodology, including a quantitative definition of validation, minimum data requirements, and a standard reporting format, is outlined. The preliminary testing of this methodology using hourly data from two Class A test facilities is presented. Finally, the collection, analysis, and documentation of preliminary data sets is discussed. DOE

N83-27421# Boeing Co., Seattle, Wash.
SOLAR PROJECT DESCRIPTION: SOUTH BRIDGE TOWERS NO. 6 MULTI-FAMILY COOPERATIVE, NEW YORK CITY, NEW YORK
30 Jun. 1982 50 p refs
(Contract DE-AI01-76CS-31020)
(DE82-019252; SOLAR/1101-82/50) Avail: NTIS HC A03/MF A01

The South Bridge Towers, Inc. solar energy system is a high-rise cooperative apartments subdivision located in New York City, New York. The solar energy collector subsystem is located on the roof of the 27-story tower and consists of 150 flat plate collectors arranged in six arrays. The collectors have a total gross area of 3790 square feed and a net aperture area of 3150 square feet. The collectors are inclined at an angle of 40 deg to horizontal, and oriented to face 14 degrees west of south. Solar energy is stored in a 4000 gallon carbon steel tank located on the tower roof. The system uses a solar energy transport medium of one-half water and one-half propylene glycol in the collector loop. Solar energy, gathered in the collector loop, is transferred to the domestic water storage subsystem by circulating the water through the collector loop heat exchanger and the storage tank. DOE

N83-27422# Automation Industries, Inc., Silver Spring, Md. Vitro Labs. Div.
SOLAR-ENERGY-SYSTEM PERFORMANCE EVALUATION. SAN ANSELMO SCHOOL, SAN JOSE, CALIFORNIA, APRIL 1981-MARCH 1982
Pekka A. Pakkala 1982 85 p refs
(Contract DE-AC01-79CS-30027)
(DE82-020142; SOLAR/2077-82/14) Avail: NTIS HC A05/MF A01

The San Anselmo School is a one story brick elementary school building in San Jose, California. The active solar energy system is designed to supply 70% of the space heating and 72% of the cooling load. It is equipped with 3740 square feet of evacuated tube collectors, a 2175 gallon tank for heat storage, a solar supplied absorption chiller, and four auxiliary gas fired absorption chillers/heaters. The measured solar fraction of 19% is far below the expected values and is attributed to severe system control and HVAC problems. Other performance data given for the year include the solar savings ratio, conventional fuel savings, system performance factor, and solar system coefficient of performance. Also tabulated are monthly performance data for the overall solar energy system, collector subsystem, space heating and cooling subsystems. Typical hourly operation data for a day are tabulated, including hourly isolation, collector array temperatures (inlet and outlet), and storage fluid temperatures. The solar energy use and percentage of losses are also graphed. DOE

N83-27423# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany).
IEA SMALL SOLAR-POWER-SYSTEM PROJECT, OPERATION STATUS
Apr. 1982 23 p
(Contract DE-AC04-76DP-00789)
(DE82-020001; DOE/NBM-2020001) Avail: NTIS HC A02/MF A01

Data collected from routine operation of the Small Solar Power Systems Project are summarized, and an overview is given of the data evaluation. The operation status of the data collection system and central receiver system is included as well as the status of the evaluation work organization. Some insolation and wind data are given. Tours by visitors are reported and the status of existing reports is given. DOE

N83-27424# Rocketdyne, Canoga Park, Calif. Rocketdyne Div.
DOWNHOLE STEAM-GENERATOR STUDY. VOLUME 1: CONCEPTION AND FEASIBILTY EVALUATION Final Report, Sep. 1978 - Sep. 1980
Jun. 1982 246 p refs
(Contract DE-AC04-76DP-00789)
(DE82-018348; SAND-82-7008) Avail: NTIS HC A11/MF A01

A feasibility evaluation of a downhill steam generator was performed by the Rocketdyne Division of Rockwell International, under contract to Sandia National Laboratories, from September 1978 to September 1980. The study was conducted in four

phases: (1) selection of a preliminary system design, (2) parametric analysis of the selected system, (3) experimental studies to demonstrate feasibility and develop design data, and (4) development of a final system design based on the parametric and experimental results. The feasibility of a low pressure combustion, indirect contact, downhole steam generator system was demonstrated. Key results from all phases of the study are presented herein. DOE

N83-27425# Arizona State Univ., Tempe. Dept. of Mechanical and Energy Systems Engineering.
HYDRAULIC AIR COMPRESSOR AS PART OF AN ULTRA LOW-HEAD HYDROPOWER SYSTEM Final Report, 1 Jan. - 31 Dec. 1981
May 1982 133 p refs
(Contract DE-FC07-80ID-12198)
(DE82-018428; DOE/ID-12198/13) Avail: NTIS HC A07/MF A01

Analytical and experimental research was conducted to advance design and application tools and information concerning the hydraulic air compressor (HAC) for use in ultra low-head hydro-power systems. An existing analytical model of the HAC was significantly improved, mainly through incorporation of modeling of air absorption into the water in the flow processes. An experimental HAC was constructed, instrumented and tested. The experiments provided data for validation of the analytical model and information concerning air entrainment fixture design, air-water separator design, and operational and control characteristics of HAC. A computer program in which calculations using the analytical model were implemented was used to calculate and tabulate the applied head, water and air flow rate, depth, pressure, and compressor size relationships. DOE

N83-27426# Meridian Corp., Falls Church, Va.
BIOMASS-ENERGY-TECHNOLOGY PROGRAM SUMMARY
Jun. 1982 131 p refs
(Contract DE-AC01-80ET-20647)
(DE82-018926; DOE/ET-20647/1) Avail: NTIS HC A07/MF A01

An account is given of the ongoing research, development, and demonstration efforts of the Biomass Energy Technology program. Descriptions are given for each of the program projects funded and/or in existence during Fiscal Year 1981, reflecting their status as of September 30, 1981. The summaries are grouped as follows: feedstock production, conversion systems, market development, and general support and analysis. DOE

N83-27427# Lincoln Lab., Mass. Inst. of Tech., Lexington.
FINAL MATERIALS, PROCESSES, AND TESTING PROGRESS REPORT FOR RESIDENTIAL AND NON-RESIDENTIAL APPLICATIONS Progress Report, Nov. 1981 - Feb. 1982
S. E. Forman and M. P. Themelis Jun. 1982 42 p refs
(Contract DE-AC02-76ET-20279)
(DE82-017285; DOE/ET-20279/190) Avail: NTIS HC A03/MF A01

I-V curves were generated for the prototype residential photovoltaic modules at both the Northeast Residential Experiment Station (NE RES) and the Southwest Residential Experiment Station (SW RES). Analyses of these measurements are given. Also presented are site measurements at Mead, Nebraska, and at Bryan, Ohio. Visual and electrical failure analysis results are also given for photovoltaic modules at Mead, Nebraska, at Bryan, Ohio, and at the Natural Bridges National Monument. DOE

N83-27428# Oak Ridge National Lab., Tenn. Chemical Technology Div.
BIOSOLAR HYDROGEN AND OXYGEN PRODUCTION
Elias Greenbaum 1982 8 p refs Presented at the 4th World Hydrogen Energy Conf., Pasadena, Calif., 13-17 Jun. 1982
(Contract W-7405-eng-26)
(DE82-017491; CONF-820605-19) Avail: NTIS HC A02/MF A01

One approach to the production of renewable hydrogen is the utilization of the photochemical machinery of photosynthesis for the production of hydrogen and oxygen from water. This method of biological solar energy conversion includes two broad categories: (1) in vitro or non-living systems and (2) intact algal systems. Work in this area has focused on demonstrating the feasibility of the thermodynamically uphill reaction which splits water into its elemental constituents: H_2O yields $H_2 + 1/2O_2$. Recent progress has been encouraging in that all three known direct, biological, photosynthetic water-splitting systems have been shown capable of simultaneous photoproduction of hydrogen and oxygen with visible light. Recent results on the long-term stability of green algae for hydrogen and oxygen photoproduction are presented, as well as a review of previous results on the kinetics of hydrogen and oxygen production by photosynthesis. DOE

N83-27429# Oak Ridge National Lab., Tenn. Chemical Technology Div.
PHOTOSYNTHETIC WATER SPLITTING
Elias Greenbaum 1982 14 p refs Presented at the SERI Biomass Program Principal Investigators Rev. Meeting, Washington, 23-25 Jun. 1982
(Contract W-7405-eng-26)
(DE82-017315; CONF-820676-1) Avail: NTIS HC A02/MF A01

It has been demonstrated that eukaryotic geen algae (as represented by Chlamydomonas) are inherently rugged algae with respect to the biophotolysis of water. There also exists a potential for selecting subpropulations of wild-type algae with enhanced properties for hydrogen and oxygen production. Second, hydrogenase activity in macroscopic marine algae does not conform to the conventional dogma of the catalog of reactions that this enzyme is supposed to catalyze. A kinetic argument has been presented which suggests that, with respect to light activated reactions, hydrogenase in these organisms operates primarily in a hydrogen uptake mode. Third, the light saturation curves for the simultaneous photoproduction of hydrogen and oxygen do not have the same analytical shape. It is suggested that a Photosystem I-like hydrogen producing light reaction may be present in anaerobically adapted Scenedesmus which is uncoupled from the Z scheme. DOE

N83-27430# Oak Ridge National Lab., Tenn. Environmental Sciences Div.
TESTIMONY PRESENTED TO SUBCOMMITTEE ON ENERGY DEVELOPMENT AND APPLICATIONS, US HOUSE OF REPRESENTATIVES. HEARINGS ON RENEWABLE ENERGY IN THE EIGHTIES: NEEDS FOR FURTHER RESEARCH, DEVELOPMENT AND DEMONSTRATION
J. Warren Ranney 1982 13 p Hearings held in Knoxville, Tenn., 28 May 1982
(Contract W-7405-eng-26)
(DE82-017407; CONF-820599-1) Avail: NTIS HC A02/MF A01

The definition and significance of short rotation intensive culture are discussed. The major areas of research and research results are presented. DOE

N83-27431# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
RENEWABLE ENERGY TECHNOLOGY HANDBOOK FOR MILITARY ENGINEERS
Mar. 1982 338 p refs
(Contract DE-AC02-77CH-00178)
(DE82-017689; SERI/SP-200-1413) Avail: NTIS HC A15/MF A01

Renewable energy applications are introduced that are considered promising for military use in the 1980s. These are: solar hot water for buildings, active solar hot water and space heating for buildings, passive solar heating and cooling of buildings, solar industrial process heata, solar ponds, photovoltaic power for homes, photovoltaic power for remote applications, parabolic dish solar systems for remote applications, wind energy for buildings, wind energy for central power plants, wind energy for water pumping, biomass energy systems for buildings, biomass energy systems for central power plants, geothermal energy for process heat, and geothermal energy for central power plants. For each of these is given: a brief history of the technology and information

on how the technology works; a detailed technical and economic profile of an operating system; and a summary listing of operating civilian and military systems that are open for public viewing. DOE

N83-27432# New Mexico Univ., Albuquerque. Energy Research and Development Inst.
SMALL HYDROELECTRIC POWER PLANT FOR AZTEC, NEW MEXICO Final Report, 1 Dec. 1980 - 28 Feb. 1982
Eugene W. Frey May 1982 158 p
(DE82-903957; NMERI-EN-12) Avail: NTIS HC A08/MF A01

Preliminary engineering results and the outcome of other specific studies associated with the establishment of a hydroelectric power plant at Aztec, New Mexico, are presented, with particular emphasis on estimated costs of construction and long term operation. Four alternative levels of effort were evaluated. Recommendations, based primarily on cost effectiveness, are presented along with material useful as a basis for a possible follow on Phase II study. At least three levels of effort appear economically attractive alternatives for the city to pursue. DOE

N83-27433# General Electric Co., Philadelphia, Pa.
DESIGN AND DEVELOPMENT OF A HIGH-CONCENTRATION PHOTOVOLTAIC CONCENTRATION (2-d)
R. C. Hodge 1982 6 p refs Presented at 16th IEEE Photovoltaics Specialists Conf., San Diego, Calif., 28 Sep. 1982
(Contract DE-AC04-76DP-00789)
(DE82-008924; SAND-82-7034C; CONF-820906-1) Avail: NTIS HC A02/MF A01

Some results are given of a program to design and develop a high concentration concentrator solar cell module which will take advantage of the high efficiency demonstrated by the latest high concentration solar cells. The concentrator is a curved groove domed Fresnel lens. The complete module is briefly described and illustrated and performance results are given. Cell efficiency at 1000X concentration reached 14 to 16%, and the power output/cell area at illuminance of 1 kW/sq m was 4 to 6 W/sq m. DOE

N83-27434# BDM Corp., Albuquerque, N. Mex.
COLLECTOR TRADE-OFF STUDY FOR BDM PRDA-35 APPLICATION
Mar. 1982 68 p refs
(Contract DE-AC04-76DP-00789)
(DE82-013532; SAND-81-7176) Avail: NTIS HC A04/MF A01

An analysis was made by BDM to compare the performance of the T-600 and T-700 linear parabolic collectors from Solar Kinetics Inc. This study was undertaken as an attempt to prevent an increase in the cost of the BDM PRDA-35 contract in the face of a substantial increase in the cost of photolvoltaic cells. Electrical and thermal properties were examined using the Photovoltaic Transient Analysis Program (PVTAP) and results were correlated with existing experimental data. This study indicated that the T-700 collector would yield a slightly more cost effective system than would the T-600 collector. DOE

N83-27435# Sandia Labs., Albuquerque, N. Mex.
OPTIMIZED LOW-COST-ARRAY FIELD DESIGNS FOR PHOTOVOLTAIC SYSTEMS
H. N. Post, D. C. Carmichael (Battelle Labs.), and J. A. Castle (Hughes Aircraft Co.) 1982 6 p refs Presented at the Am. Sect. of the Intern. Solar Energy Soc. Conf., Houston, Tex., 1 Jun. 1982
(Contract DE-AC04-76DP-00789)
(DE82-013640; SAND-81-2380C; CONF-820629-7) Avail: NTIS HC A02/MF A01

A comprehensive program to define and develop array field subsystems which can achieve the lowest possible lifecycle costs is discussed. The major activity of this program is described, namely, the design and development of optimized, modular array fields for photovoltaic (PV) systems. As part of this activity, design criteria and performance requirements for specific array subsystems including support structures, foundations, intermodule connections, field wiring, lightning protection, system grounding, site preparation, and monitoring and control were defined and evaluated. Similarly, fully integrated flat-panel array field designs, optimized for lowest lifecycle costs, were developed for system sizes ranging from 20 to 500 kW sub p. Key features, subsystem requirements, and projected costs for these array field designs are presented and discussed. DOE

N83-27436# Battelle Columbus Labs., Ohio.
EVALUATION OF BIOMASS SYSTEMS FOR ELECTRICITY GENERATION Final Report
E. S. Lipinsky, D. A. Ball, and D. Anson Feb. 1982 163 p refs
(EPRI Proj. 1348-7)
(DE82-901865; EPRI-AP-2265) Avail: NTIS HC A08/MF A01

State-of-the-art information and evaluation of alternative biomass systems for generation of electricity are provided. The biomass systems consist of silvicultural or agricultural resources, processing and conversion technology to make biomass-derived fuels, and electricity-generating technology. The systems are delineated in energy network charts and are evaluated in matrices that display biomass-system alternatives and multiple technical, economic, and environmental-impact criteria. DOE

N83-27437# Massachusetts Inst. of Tech., Cambridge.
FLYWHEEL ENERGY-STORAGE-AND-CONVERSION SYSTEM FOR PHOTOVOLTAIC APPLICATIONS Final Report
Philip O. Jarvinen Mar. 1982 337 p refs
(Contract DE-AC02-76ET-20279)
(DE82-017128; DOE/ET-20279/159) Avail: NTIS HC A15/MF A01

Efforts to develop a magnetically suspended solar photovoltaic flywheel energy storage unit for residential applications are discussed. A 1/10-scale prototype flywheel unit, which stores 1 kWh of energy in a 400-pound, 15-inch-diameter steel rotor at a maximum of 15,000 RPM, was designed, constructed and tested. The 1/10-scale prototype unit was based on a full-scale, 40-kWh residential flywheel design and was a total system in that it included all the electrical features needed for a complete interface between a photovoltaic array and a residential or utility load. Design features of the unit, such as its magnetic bearing, motor-generator, rotor and output power-conditioning equipment, are described and test results are presented. Manufacturing cost studies of the full-scale, 40-kWh residential flywheel system are reported along with user worth studies of flywheel systems in the Northeast and Southwest. The 1/10-scale prototype test setup was modified into an advanced prototype flywheel test unit. DOE

N83-27438# Lincoln Lab., Mass. Inst. of Tech., Lexington.
NATURAL BRIDGES NATIONAL MONUMENT PHOTOVOLTAIC POWER PLANT OPERATIONS MANUAL
S. D. Coleman, ed. Feb. 1982 274 p refs
(Contract DE-AC02-76ET-20279)
(DE82-015388; DOE/ET-20279/142) Avail: NTIS HC A12/MF A01

After a basic introduction and overview of the photovoltaic system at the Natural Bridges National Monument, a history of the project and a description of the installation, safety procedures essential for all operators and maintenance personnel are discussed. Locations and detailed descriptions of the equipment are provided to permit operators to identify the system controls and equipment. Step by step system operation procedures are described, including diesel generator start up and photovoltaic power system turn on. Information is provided about routine monitoring and maintenance of the system. DOE

N83-27439# Boeing Computer Services, Inc., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT, FOR APRIL 1982. VOLUME 2: FOR MISSISSIPPI COUNTY COMMUNITY COLLEGE, BLYTHEVILLE, ARKANSAS
Jan. 1983 29 p Prepared for Sandia Labs., Albuquerque, N. Mex. 4 Vol.
(Contract DE-AC04-76DP-00789)
(DE83-006446; SAND-81-7091/2) Avail: NTIS HC A03/MF A01

Data accumulated during April 1982 at the intermediate photovoltaic project at Mississippi County Community College, Blytheville, Arkansas are presented. Energy and environmental (weather) data are presented graphically. Explanations of irregularities not attributable to weather are provided. DOE

N83-27440# Boeing Computer Services, Inc., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT, FOR SEPTEMBER 1982. VOLUME 5: FOR OKLAHOMA CENTER FOR SCIENCE AND ARTS
Jan. 1983 23 p Prepared for Sandia Labs., Albuquerque, N. Mex. 4 Vol.
(Contract DE-AC04-76DP-00789)
(DE83-006448; SAND-81-7087/5) Avail: NTIS HC A02/MF A01

Data accumulated during September 1982 at the intermediate photovoltaic project at Oklahoma Center for Science and Arts, Oklahoma City, Oklahoma are presented. Energy and environmental (weather) data are presented graphically. Explanations of irregularities not attributable to weather are provided. DOE

N83-27441# Boeing Computer Services, Inc., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT, FOR OCTOBER 1982. VOLUME 16: FOR LOVINGTON SQUARE SHOPPING CENTER, LOVINGTON, NEW MEXICO
Jan. 1983 26 p Prepared for Sandia Labs., Albuquerque, N. Mex. 4 Vol.
(Contract DE-AC04-76DP-00789)
(DE83-006447; SAND-81-7085/16) Avail: NTIS HC A03/MF A01

Data accumulated during October 1982 at the intermediate photovoltaic project at Lovington Square Shopping Center, Lovington, New Mexico are presented. Energy and environmental (weather) data are presented graphically.Explanations of irregularities not attributable to weather are provided. DOE

N83-27442# Boeing Computer Services, Inc., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT. VOLUME 16: FOR NEWMAN POWER STATION, EL PASO, TEXAS FOR OCTOBER 1982
Jan. 1983 24 p Prepared for Sandia Labs., Albuquerque, N. Mex. 4 Vol.
(Contract DE-AC04-76DP-00789)
(DE83-006445; SAND-81-7086/16) Avail: NTIS HC A02/MF A01

Data accumulated during October 1982 at the intermediate photovoltaic project at Newman Power Station, El Paso, Texas are presented. Energy and environmental (weather) data are presented graphically. Explanations of irregularities not attributable to weather are provided. DOE

N83-27443# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
RESEARCH RESULTS FOR THE TORNADO WIND-ENERGY SYSTEM: ANALYSIS AND CONCLUSIONS
Eric Jacobs Jan. 1983 14 p refs Presented at the ASME Solar Energy Div. 6th Ann. Tech. Conf., Orlando, Fla., 19-21 Apr. 1983
(Contracts EG-77-C-01-4042; DE-AC02-77CH-00178)
(DE83-006091; SERI/TP-211-1889) Avail: NTIS HC A02/MF A01

The Tornado Wind Energy System (TWES) concept utilizes a wind driven vortex confined by a hollow tower to create a low pressure core intended to serve as a turbine exhaust reservoir. The turbine inlet flow is provided by a separate ram air supply. Numerous experimental and analytical research efforts investigated the potential of the TWES as a wind energy conversion system (WECS). A simplified cost analysis incorporating research results is included. Based on these analyses, the TWES does not show significant promise of improving on either the performance or the cost of energy attainable by conventional WECS. The prospects for achieving either a system power coefficient above 0.20 or a cost of energy less than $0.50 per/kWh (1979 dollars) appear to be poor. DOE

N83-27444# Pittsburgh Univ., Pa.
ADDITION OF DEVOLATILIZATION EQUATIONS TO SYNTHANE COMPUTERIZED MATHEMATICAL MODEL Final Report, 15 Sep. 1978 - 14 Sep. 1979
James T. Cobb, Jr. and Cheng-Kuang Wu Jan. 1983 133 p refs
(Contract DE-AS22-78ET-00277)
(DE83-006243; DOE/ET-00277/T1) Avail: NTIS HC A07/MF A01

A mathematical model, based on IGT (Institute of Gas Technology) kinetics, to simulate the gasification of coal in the SYNTHANE gasifiers was developed. By using this program the PETC has analyzed some 35 runs in the SYNTHANE PDU and 14 runs in the SYNTHANE Pilot Plant for noncaking western coal. The amount of devolatilization of coal particles falling through the carbonizer of both the PDU and Pilot Plant during these 49 runs were predicted using calculated particle temperature profiles along the carbonizer. In making these predictions, the effect of changes in the three parameters of kinetics model were analyzed. DOE

N83-27445# Houston Univ., Tex. Dept. of Mechanical Engineering.
ANALYSIS, DESIGN, FABRICATION, AND TESTING OF MODERATELY CONCENTRATING SOLAR-ENERGY COLLECTORS Final Report, Jun. 1976 - Dec. 1979
Richard B. Bannerot Nov. 1982 115 p refs
(Contracts DE-AS05-76CS-35100; E(40-1)-5100)
(DE83-006065; DOE/CS-35100/T1) Avail: NTIS HC A06/MF A01

Several topics related to the analysis, design and fabrication of trough like concentrations with flat reflectors are presented. An analytical design concept to help identify optimal optical designs is presented. A computer simulation which performs detailed analyses of given designs is described. Basic heat transfer studies wee performed to develop a better understanding of the natural convection mechanisms in specific geometries related to the collectors, namely long, groove like shapes and annular regions. DOE

N83-27446# Sandia Labs., Albuquerque, N. Mex. Solar Systems Applications Div.
EXPERIMENTAL RESULTS OF PITCHING MOMENT TESTS ON PARABOLIC-TROUGH SOLAR-COLLECTOR ARRAY CONFIGURATIONS
Duane E. Randall, Roger E. Tate, and David A. Powers Dec. 1982 28 p refs
(Contract DE-AC04-76DP-00789)
(DE83-006027; SAND-82-1569) Avail: NTIS HC A03/MF A01

Two wind-tunnel tests were conducted to investigate specifically the pitching moment characteristics of parabolic-trough solar-collector modules deployed within a collector array. The collector modules were located within various rows of a simulated array configuration to investigate shielding effects from upstream collector rows and/or wind-screen fences. Selected fence configurations and fence spacing upstream from the initial array row were studied. The test results demonstrate that pitching moment is significantly reduced by sheilding provided by upstream fencing or collector rows. DOE

N83-27447# Stanford Univ., Calif. Dept. of Mechanical Engineering.
EFFECTS OF CORE NONUNIFORMITIES ON THE PERFORMANCE OF MHD GENERATORS Ph.D. Thesis
M. Craig Wynn Sep. 1982 240 p refs
(Contract DE-AC01-80ET-15611)
(DE83-005426; DOE/ET-15611/T6) Avail: NTIS HC A11/MF A01

The effects on MHD generator performance of nonuniform temperature and electrical conductivity distributions in the core of a combustion plasma were investigated. Experiments were

performed in which the plasma temperature field in a laboratory scale MHD channel was perturbed by injection of room temperature nitrogen. A model was developed by extending an existing, simple one dimensional theory. The model was applied to a pilot plant scale channel and a significant decrease in power production was predicted as a result of nonuniform core properties originating in combustor components. The losses in generator performance due to plasma nonuniformities predicted represent a limiting case in which property variations exhibit a two dimensional geometry. The quasi-2D model may be an effective aid in MHD combustor design as well as serving as a basis for comparing theories considering more complex nonuniformity geometry. DOE

N83-27448# Los Alamos Scientific Lab., N. Mex.
ASSESSMENT OF WATER USE IMPACTS FROM SOLAR-ENERGY DEVELOPMENT
Mar. 1982 25 p refs
(Contract W-7405-eng-36)
(DE83-004888; LA-S-482-2) Avail: NTIS HC A02/MF A01

It is found that solar energy technologies could represent a slight water savings over the displaced conventional technologies, particularly in the east, however, the projected water saving is on the order of several tenths of a percent of total projected water consumption by the end of the century. The potential does exist for certain localized impacts where concentrations of solar collectors are sited and consume large but periodic quantities of water (for washing the collector surfaces and recharging the primary coolant loop) for municipal supply systems. This could result in seasonal problems in the municipalities where water supply systems are stressed or subject to periodic shortages. DOE

N83-27449# Yale Univ., New Haven, Conn. Dept. of Chemical Engineering.
DEACTIVATION AND REGENERATION OF HYDROGENOLYSIS ACTIVITY OVER Rh-Ag BIMETALLIC CATALYSTS SUPPORTED ON TiO2
D. E. Resasco and G. I. Haller 1982 21 p refs Presented at Ann. Meeting of Heat Transfer and Energy Conversion, Los Angeles, 14 Nov. 1982
(Contract DE-AC02-81ER-10829)
(DE82-011240; CONF-821106-6) Avail: NTIS HC A02/MF A01

An indirect effect of support on the kind of bimetallic interaction was observed on Rh-Ag catalysts supported on TiO2 compared to SiO2. This effect occurs at significantly lower temperatures than the direct Strong Metal-Support Interaction (SMSI) between Rh and TiO2. The main feature of this indirect effect is a pronounced decay in the H2 chemisorption capability and activity for ethane hydrogenolysis with time when the catalysts are left in flowing H2 at 523K. This behavior can be rationalized in terms of a modification of the energetics of the metal-metal interaction, which may cause the Ag to spread over Rh particles. Hydrogenolysis activity and H2 chemisorption capacity can be regenerated by an oxidation-reduction treatment. DOE

N83-27450# California Univ., Livermore. Lawrence Livermore Lab.
LABORATORY TESTS AT ELEVATED PRESSURES OF A SILANE IGNITER SYSTEM FOR IN-SITU COAL GASIFICATION
C. B. Thorsness, D. F. Skinner, and D. B. Fields 15 Nov. 1982 32 p refs
(Contract W-7405-eng-48)
(DE83-007217; UCRL-53361) Avail: NTIS HC A03/MF A01

A silane/propane igniter and burner system was used for the first time in underground coal gasification experiments in the Tono Basin of Washington in the winter of 1981-1982. With this system, a small diameter tube (1/2 in.) is inserted in the hole to the point where ignition is desired; the tube is purged with nitrogen to drive out the air, and a change of the pyrophoric gas silane (SiH4) is forced through itp when the silane reaches the end of the tube, it bursts into flame upon exposure to the air; a fuel gas such as propane is sent through the tube behind the silane to sustain the burn for as long as desired. The system was designed both for igniting coal and for burning through steel pipe from the inside to provide a new outlet from the pipe. The optimum operating procedure for the igniter system was demonstrated and the system was tested under evelated pressures such as may be encountered in underground coal gasification. It is found that the essential steps in the operating procedure are to turn off the flow briefly after the silane reaches the end of the tube, then slowly begin the flow of fuel behind the silane. Both propane and methane were tested as fuels; propane was found to be preferable for pressures up to about 70 psia (5 atm), and methane for higher pressures. The upper pressure limit for silane ignition was found to be about 230 psia (16 atm). DOE

N83-27451# Boeing Aerospace Co., Seattle, Wash.
CADMIUM SULFIDE/COPPER TERNARY HETEROJUNCTION CELL RESEARCH Final Report, 1 Apr. 1980 - 25 Aug. 1982
R. A. Mickelsen and W. S. Chen Aug. 1982 110 p refs
(Contract DE-AC02-77CH-00178)
(DE83-000997; SERI/TR-8012-1-T1) Avail: NTIS HC A06/MF A01

The properties of polycrystalline, thin film CuInSe2/CdS and CuInSe2/Zn/sub metallized alumina substrates are described. The mixed sulfuide cells are described as exhibiting increased open circuit voltages, slightly higher short circuit currents, and improved efficiencies. Mixed sulfide film preparation by evaporation of CdS and ZnS powders from a single source and from two sources is discussed with preference given to the later technique. Selenide film preparation in a planetary or rotating substrate vacuum deposition apparatus is described. A 1 cm(2) area cell without AR-coating produced by the planetary approach demonstrates a 7.5% efficiency. The results of cell heat treatment studies which show a strong environmental dependence are presented and indicate the desirability of an oxygen containing atmosphere. An automatic, computer controlled, cell-measurement system for I-V, C-V, and spectral response analysis is described. The results of the cell analysis and cell modeling studies on both the plain CdS and mixed Zn/sub x/Cd/sub 1-x/S thin-film devices are presented. DOE

N83-27452# Rockwell International Corp., Canoga Park, Calif. Energy Technology Engineering Center.
AN OVERVIEW OF THE SOLAR IN FEDERAL BUILDINGS DEMONSTRATION PROGRAM (SFBP)
O. R. Hillig and P. J. Pekrul 1983 34 p refs Presented at the DOE Workshop on Performance Monitoring of Active Solar Energy Systems, Cape Canaveral, Fla., 20-21 Jan. 1983
(Contract DE-AC03-76SF-00700)
(DE83-005757; CONF-830124-1) Avail: NTIS HC A03/MF A01

The program objectives, project mix and location, and project status are reviewed. The primary technical activities are described: site surveys, design reviews, cost approvals, acceptance testing, and long term monitoring. DOE

N83-27453# Joint Center for Graduate Study, Richland, Wash.
SILICON MIS/INVERSION-LAYER SOLAR CELLS Final Report, 1 Oct. 1981 - 30 Sep. 1982
Larry C. Olsen Oct. 1982 43 p refs
(Contract DE-AC02-77CH-00178)
(DE83-005422; SERI/TR-1274-1-T1) Avail: NTIS HC A03/MF A01

Silicon Metal-Insulator-Semiconductor/Inversion-Layer (MIS-IL) solar cells were investigated as an approach to low cost terrestrial photovoltaics. Considerable progress was made concerning the development of procedures for SiO deposition for inversion-layer formation, the characterization of the fixed charge in deposited SiO layers, surface state density at the Si-SiO interface, fabrication and characterization of MIS-IL solar cells. Improvements were also made in the theory of MIS-IL solar cells, and utilized to calculate cell performance for a range of insulator charge and base resistivities. Inversion layer formation was studied in several ways. MOS devices was analyzed to determine the magnitude of the net positive charge, Q/sub POS/, vensus surface potential, Psi/sub S/. In situ sheet resistance measurements was made to determine the charge distribution within the deposited SiO layer. Finally,

estimates of Q/sub POS/ obtained by comparing experimental results for MIS-IL cells and theory are compared with values of Q/sub POS/ determined for MOS structures fabricated simultaneously with the solar cells. Cell fabrication procedures emphasized low temperature processing. DOE

N83-27454# Boeing Computer Services, Inc., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT FOR G. N. WILCOX HOSPITAL, KAUAI, HAWAII FOR SEPTEMBER 1982, VOLUME 5
Jan. 1983 28 p
(Contract DE-AC04-76DP-00789)
(DE83-006843; SAND-81-7080/5) Avail: NTIS HC A03/MF A01

The data accumulated during September 1982 at the intermediate photovoltaic project at G.N. Wilcox Memorial Hopsital, Kauai, Hawaii are presented. Generated energy and environmental data are presented graphically. Explanations of irregularities not attributable to weather are provided. DOE

N83-27455# Energy Systems Group, Inc., Atlanta, Ga.
ANALYSIS OF FIELD-TEST DATA FROM DOMESTIC SOLAR-WATER HEATERS IN THE SOUTHERN UNITED STATES Report, period ending Sep. 1982
William M. Jones and Mary Frances Fenner Jan. 1983 90 p refs
(Contract DE-AC02-82CH-10122)
(DE83-006822; DOE/CH-10122/12) Avail: NTIS HC A05/MF A01

The monitored performance data was gathered from 137 solar water heaters. All but 51 are located in Florida. The gathered data accumulated from weekly mailers consists of the following measurements: total gallons of hot water consumed; total kWh of electricity used; total hours the circulating pump operated; hot and cold water temperatures at the top; number of household members at home since last reading; tank thermostat setting and any changes to it; total number of hours that the tank's backup heating element had power available; and problems or comments concerning system operational status or component reliability and maintenance. The data analysis is described and results are presented. DOE

N83-27456# Colorado State Univ., Fort Collins. Solar Energy Applications Lab.
HOW TO SOLVE MATERIALS AND DESIGN PROBLEMS IN SOLAR HEATING AND COOLING, ENERGY TECHNOLOGY REVIEW NO. 77
Dan S. Ward, Harjinder S. Oberoi, and Stephen D. Weinstein (The Ehrenkrantz Group) 1982 317 p refs
(DE83-006116; DOE/NBM-3006116) Avail: NTIS HC A14/MF A01

Difficulties encountered in active and passive solar space heating systems and active solar space cooling systems are reported. The problems include design errors, installation mistakes, inadequate durability of materials, unacceptable reliability of components, and wide variations in performance of operation of different solar systems. Feedback from designers and manufacturers involved in the solar market is summarized. The designers' experiences with and criticisms of solar components are presented, followed by the manufacturers' replies to the various problems encountered. Information is presented on the performance and operation of solar heating and cooling systems to enable future designs to maximize performance and eliminate costly errors. DOE

N83-27457# Hahn-Jackson-Thresher-Henning, Inc., Evansville, Ind.
SOLAR-ASSISTED WATER-SOURCE HEAT PUMP Final Report
10 Jan. 1983 62 p
(Contract DE-FG02-81R5-10298)
(DE83-006023; DOE/R5-10298/T2) Avail: NTIS HC A04/MF A01

The construction of two solar assisted water source heat pump systems to evaluate the use of night sky radiation using standard solar collectors is reported. The design of the system's controller is described, and project efforts are summarized. The procedure involved in the determination of the feasibility of night sky radiation as the means of rejecting heat through solar collectors for a sample house is reported. Conclusions on different types of coatings that are used on solar collectors are presented. A system and its backup are designed and cooling tower and night sky radiation are compared. DOE

N83-27458# Sandia Labs., Albuquerque, N. Mex. Thermal Sciences Div.
DRAC: A USER-FRIENDLY COMPUTER CODE FOR MODELING TRANSIENT THERMOHYDRAULIC PHENOMENA IN SOLAR-RECEIVER TUBING
W. S. Winters Jan. 1983 45 p refs
(Contract DE-AC04-76DP-00789)
(DE83-007091; SAND-82-8744) Avail: NTIS HC A03/MF A01

The capabilities of DRAC (Dynamic Receiver Analysis Code) are presented. The DRAC is the first in a series of user friendly driver programs for the more general code. TOPAZ (transient one dimensional pipe flow analyzer). The DRAC permits the user to model both transient and steady state thermohydraulic phenomena in solar receiver tubing. Users may specify arbitrary, time dependent, incident heat flux profiles and/or flow rate changes and DRAC will calculate the resulting transient excursions in tube wall temperature and fluid properties. Radiative and convective losses are accounted for and the user may model any receiver flud (compressible or incompressible) for which thermodynamic data exists. The DRAC code, a comprehensive set of steady state validation calculations, and detailed user instructions are described. DOE

N83-27459# Boeing Commercial Airplane Co., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENTAL OPERATIONAL PERFORMANCE REPORT FOR NEWMAN POWER STATION, EL PASO, TEXAS FOR SEPTEMBER 1982, VOLUME 15
Jan. 1983 24 p 15 Vol.
(Contract DE-AC04-76DP-00789)
(DE83-006845; SAND-81-7086/15) Avail: NTIS HC A02/MF A01

The data accumulated during September 1982 at the intermediate photovoltaic project at Newman Power Station, El Paso, Texas are presented. Generated energy and environmental (weather) data are presented graphically. Explanations of irregularities not attributable to weather are provided. DOE

N83-27460# Boeing Commercial Airplane Co., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT FOR BEVERLY HIGH SCHOOL, BEVERLY, MASSACHUSETTS FOR AUGUST 1982, VOLUME 12
Jan. 1983 29 p 15 Vol.
(Contract DE-AC04-76DP-00789)
(DE83-007092; SAND-81-7088/12) Avail: NTIS HC A03/MF A01

Data accumulated during August at the intermediate photovoltaic project at Beverly High School, Beverly, Massachusetts are presented. Generated energy and environmental (weather) data are presented graphically. Expanations of irregularities not attributable to weather are provided. DOE

N83-27461# Rockwell International Corp., Golden, Colo. Wind Energy Research Center.
TECHNICAL AND MANAGEMENT SUPPORT FOR THE DEVELOPMENT OF SMALL WIND SYSTEMS Annual Report for fiscal year, 1 Oct. 1980 - 30 Sep. 1981
Aug. 1982 130 p refs
(Contract DE-AC04-76DP-03533)
(DE83-007197; RFP-3425) Avail: NTIS HC A07/MF A01

Efforts of the Wind Systems Program are summarized, including

program management, test operation, engineering, and project operations. DOE

N83-27462# Sandia Labs., Albuquerque, N. Mex.
LITHIUM/SO2 CATHODE STUDIES
C. D. Jaeger, S. C. Levy, C. C. Crafts, and J. C. DAngelo 1982 23 p refs Presented at the 13th Intern. Power Sources Symp., Brighton, England, 27 Sep. 1982
(Contract DE-AC04-76DP-00789)
(DE82-012777; SAND-81-2247C; CONF-820907-2) Avail: NTIS HC A02/MF A01

The use of complex impedance analysis for the study of porous carbon cathode collectors used in lithium-sulfur dioxide batteries is described. Fresh cathodes exhibit cylindrical pore behavior at high frequencies and planar electrode behavior at low frequencies. At intermediate frequencies the impedance plots are dependent on the pore geometry. As cathodes are discharged and the pores begin to plug up with solid reaction product, the impedance plots reflect the change from porous to a rough planar electrode. This change is illustrated using porous carbon cathodes from actual Li/SO2 batteries. Results of this study indicate that complex impedance analysis is a useful tool for the study of porous battery electrodes, both in the characterization of physical parameters and in the understanding of electrode behavior during discharge. DOE

N83-27463# Sandia Labs., Albuquerque, N. Mex. Exploratory Batteries Div.
IMPROVEMENTS IN Li(Si)/FeS2 THERMAL BATTERY TECHNOLOGY
Jimmie Q. Searcy and James R. Armijo Jun. 1982 20 p refs
(Contract DE-AC04-76DP-00789)
(DE82-017779; SAND-82-0565) Avail: NTIS HC A02/MF A01

Potential improvements in Li(Si)/FeS2 thermal battery technology were evaluated using as the test vehicle a 28 +-4-V, 400 cu cm battery discharged through a 28 omega load. Successful improvements included incorporating a catholyte additive to improve voltage regulation during discharge, changing the catholyte composition and blending procedure to increase life and current carrying capability, changing the anode composition to obtain better voltage regulation, and optimizing the heat and mass input. One end of life mechanism for higher current drain batteries was determined to be electrolytic freeze-out at the anode at temperatures that increase as the current density increases. The increase in freezing temperature was caused by a change in the K(+)li(+) ratio in the electrolyte near the anode as the anode discharged. A balanced ratio of cathode to anode weight was determined for the two catholytes and anode powders considered. The balance was based on electrode polarization at various resistive loads. DOE

N83-27464# Physical Sciences, Inc., Woburn, Mass.
AMMONIA-AIR FUEL CELL POWER PLANT SYSTEMS ANALYSIS Final Report, 9 Sep. - 30 Nov. 1981
D. Bloomfield May 1982 43 p refs Prepared for LBL and LLL
(Contracts DE-AC03-76SF-00098; W-7405-eng-48)
(DE82-018914:; LBL-14500) Avail: NTIS HC A03/MF A01

A steady state systems model of an alkaline fuel cell power plant was synthesized. The fuel cell used in this study is a low temperature cell (80 C) with a 35% wt KOH electrolyte flowing through, and is coupled to an ammonia cracker. The systems analysis was performed using the PSI/S3E program. Two important features in the fuel cell operations were considered; the product water disposition and the thermal management. A water balance around the cell was performed, and the heat was removed by the electrolyte. The effect of several design parameters on the fuel cell performance and the overall plant efficiency was studied. Results are presented and discussed. DOE

N83-27465# Pacific Northwest Lab., Richland, Wash.
GEOTECHNICAL FACTORS AND GUIDELINES FOR STORAGE OF COMPRESSED AIR IN SOLUTION-MINED SALT CAVITIES
R. D. Allen, T. J. Doherty, and R. L. Thoms May 1982 106 p refs
(Contract DE-AC06-76RL-01830)
(DE82-017611; PNL-4242) Avail: NTIS HC A06/MF A01

The state of knowledge about utilization of solution mined salt cavities for CAES including laboratory experiments, numerical modeling, field characterization, solution mining experience, and operating parameters is outlined. Topics evaluated include: cavern geometry and size; long term creep and creep rupture of rock salt; effects of pressure and temperature loading rates; low frequency fatigue; progressive deterioration of salt fabric with possible air penetration; cavern monitoring methods; and salt properties at nonambient conditions. The only CAES operational facility in the world uses two solution mined salt cavern for air storage and is operating successfully. Stability critera for solution mined salt caverns. DOE

N83-27466# Purdue Univ., Lafayette, Ind. School of Mechanical Engineering.
DOMESTIC OLIVINE VERSUS MAGNESITE AS A THERMAL ENERGY STORAGE MATERIAL: PERFORMANCE COMPARISONS FOR ELECTRICALLY HEATED ROOM-SIZE UNITS IN ACCORDANCE WITH ASHRAE STANDARD 94.2
W. R. Laster, R. J. Schoenhals, B. M. Gay and H. Palmour, III (North Carolina State Univ., Raleigh) 1982 23 p refs Presented at the ASHRAE Ann. Meeting, Toronto, 27 Jun. - 1 Jul. 1982
(Contract W-7405-eng-26)
(DE82-017389; CONF-820664-4) Avail: NTIS HC A02/MF A01

Electrically heated thermal energy storage (TES) heaters employing high heat capacity ceramic refractories for sensible heat storage have been in use in Europe for several years. With these heaters, low cost off peak electrical energy is stored by heating a storage core composed of ceramic material to approximately 800 C. During the peak period, no electrical energy is used as the building heating needs are supplied by extracting the stored heat from the core by forced air circulation. Recently significant interest in the use of off peak TES units in the US has occurred, leading to the search for a domestic supply of high heat capacity ceramic refractory material. North Carolina's extensive but under utilized supply of refractory grade olivine has been proposed as a source of storage material for these units. In this paper, the suitability of North Carolina olivine for heat storage applications is assessed by comparing its thermal performance with that of European materials. DOE

N83-27467# Exide Management and Technology Co., Yardley, Pa.
RESEACH, DEVELOPMENT, AND DEMONSTRATION OF LEAD-ACID BATTERIES FOR ELECTRIC VEHICLE PROPULSION Annual Report, 1981
Mar. 1982 94 p refs
(Contract W-31-109-eng-38)
(DE82-016225; ANL/OEPM-81-9) Avail: NTIS HC A05/MF A01

The progress of the design and development program is detailed. Results of drop tests, characteristics tests, and life cycle tests are presented and discussed. Results of tests of mechanical agitation of the electrolyte by air bubbling and an air lift pump are reported. Work on the electrode designs and electrolyte circulation systems is reported. DOE

N83-27468# Varta Batterie A.G., Kelkheim (West Germany).
COST/DESIGN STUDY AND FABRICATION/TESTING OF A 300-W GAS-RECOMBINATION DEVICE FOR UTILITY LEAD-ACID CELLS
May 1982 51 p refs Prepared for Argonne National Lab., Ill.
(Contract W-31-109-eng-38)
(DE82-019800; ANL/OEPM-82-4) Avail: NTIS HC A04/MF A01

During Phase III of the project Hydrogen-Oxygen Recombination Devices for Utility Lead-Acid Cells, VARTA Batterie AG (1) performed a design update and cost study for a low cost 300 W hydrogen-oxygen recombination device (HORD) of plastic construction, (2) fabricated and tested this unit, and (3) conducted experiments to evaluate its safety. A 300 W plastic HORD was

designed with special consideration for ease of maintenance and low cost fabrication. To improve the operational safety, special options such as safe gas storage and flame arresters may be selected. Costs for the HORDs were estimated to range from $5 to $10 per kWh of the cell's energy content for large scale production (10,000 units). A single 300 W HORD made of high temperature resistant plastic was fabricated and tested on a 4 kAh low antimony lead acid cell. At the nominal power of 300 W, which is equivalent to an overcharge current of 200 A, the recombination efficiency is 100%. Gases from an overload of 50% (300 A) were recombined with a slightly reduced efficiency of 99%. DOE

N83-27469# Mitre Corp., McLean, Va.
STATUS OF THE DOE BATTERY AND ELECTROCHEMICAL TECHNOLOGY PROGRAM, 3
R. Roberts Feb. 1982 313 p refs Prepared for Lawrence Berkeley Lab., Calif.
(Contract DE-AC03-76SF-00098)
(DE82-018912; LBL-14438; MTR-81W223) Avail: NTIS HC A14/MF A01

The potential contributions of the battery and electrochemical technology efforts to electric vehicles, solar electric systems, and energy conservation in industrial electrochemical processes, are reviewed. The analyses of the potential impact of these systems on energy technologies as the basis for selecting specific battery systems for investigation are noted. The battery systems in the research, development, and demonstration phase discussed include: aqueous mobile batteries (near term) - lead-acid, iron/nickel-oxide, zinc/nickel-oxide; advanced batteries - aluminum/air, iron/air, zinc/bromine, zinc/ferricyanide, chronous/ferric, lithium/metal sulfide, sodium/sulfur; and exploratory batteries - lithium organic electrolyte, lithium/polymer electrolyte, sodium/sulfur (IV) chloroaluminate, calcium/iron disulfide, lithium/solid electrolyte. Supporting research on electrode reactions, cell performance modeling, new battery materials, ionic conducting solid electrolytes, and electrocatalysis is reviewed. Potential energy saving processes for the electrowinning of aluminum and zinc, and for the electrosynthesis of inorganic and organic compounds are included. DOE

N83-27470# Oak Ridge National Lab., Tenn. Energy Div.
ECONOMIC EVALUATION OF END-USER CONSERVATION MEASURES APPLIED TO BUILDINGS SERVED BY A PROPOSED DISTRICT-HEATING SYSTEM
M. Eksel (Tennessee Univ.), W. G. Sullivan (Tennessee Univ.), G. D. Pine, and M. A. Karnitz May 1982 56 p refs
(Contract W-7405-eng-26)
(DE82-016080; ORNL/TM-8277) Avail: NTIS HC A04/MF A01

The economic implications of applying end user conservation measures to buildings that are served by a proposed district heating system in the Minneapolis-St. Paul area are examined. End user conservation is a demand side conservation strategy typified by changes in building operating procedures and changes in the building shell. District heating with cogeneration is a supply side conservation method that allows scarce fossil fuels to be more efficiently converted into thermal and electrical energy. Technically, these two conservation methods can be applied simultaneously to a densely populated urban area such a Minneapolis-St. Paul, but the implementation of one tends to reduce the economic feasibility of the other. This analysis suggests that building conservationmeasures will be difficult to justify economically in buildings that are connected to the proposed Minneapolis-St. Paul system. DOE

N83-27471# One America, Inc., Washington, D.C.
WASTE-TO-ENERGY COMPENDIUM: REVISED 1982 EDITION
Aug. 1982 296 p refs
(Contract DE-AC01-80CS-24312)
(DE82-020328; DOE/CS-24312/1) Avail: NTIS HC A13/MF A01

This report surveys 49 waste-to-energy recovery projects throughout the United States. Included are ten refuse-derived fuel (RDF) production facilities, eight RDF user facilities, five combined RDF production-user facilities, and 26 mass burning facilities ith energy recovery. Only those facilities that are fully operational or those in advanced stages of startup and shakedown are surveyed. Information is provided on processing capacities, operation and maintenance problems, equipment specifications, capital and operating costs, and the current status of each facility. In addition, process flow schematics are provided for each of the ten RDF production plants and the five RDF production-user plants. DOE

N83-27472# Center for Renewable Resources, Washington, D.C.
PUTTING RENEWABLE ENERGY TO WORK IN CITIES
Gerald Mara Jun. 1982 447 p refs
(Contract DE-AC01-79ET-20622)
(DE82-017237; DOE/ET-20622/1) Avail: NTIS HC A19/MF A01

Guidelines are provided to help local energy officials assess their own urban energy contexts, and indications are given of how different energy technologies might fit within different city contexts or neighborhoods. Applications discussed include domestic hot water, heating and cooling of buildings, and community heating and cooling systems. Electricity, industrial process heat and fuels from revewable resources are included. Incremental planning as a way of making the best use of scarce resources is discussed, and the conservation and renewable options are overviewed. Land use for energy programs is discussed, and the kind of information needed on the city's existing building stock is given. Information needed on energy supply and distribution is also discussed. Socioeconomic factors of the city's energy and situation and related action are described. DOE

N83-27473# Louisiana State Univ., Baton Rouge.
TECHNICAL SUPPORT FOR GEOPRESSURED-GEOTHERMAL-WELL ACTIVITIES IN LOUISIANA Annual Report, 1 Nov. 1980 - 31 Oct. 1981
D. G. Bebout, Z. Bassiouni, D. R. Carver, C. G. Groat, R. H. Pilger, Jr., and F. M. Wrighton 31 Mar. 1982 321 p refs
(Contract DE-AC08-81NV-10174)
(DE83-005297; DOE/NV-10174/1) Avail: NTIS HC A14/MF A01

Regional assessment of the volume and distribution of potential sandstone reservoirs from each formation was made from data from the 15 dip cross sections and 1 strike cross section. Reservoir bulk volume was determined by constructing a sandstone isopach map. The contour lines of net sandstone were planimetered, and the units obtained were converted to acres. A plot of the contour values vs acres was used to determine the bulk volume in acre feet, which then was converted to cubic miles. Total in place solution methane resources of 371 TCF was estimated to be present in the Wilcox, Frio, and Miocene of onshore Louisiana. DOE

N83-27474# Resource Transitions, Inc., Santa Cruz, Calif.
ENERGY FUTURE SANTA CRUZ. A CITIZENS PLAN FOR ENERGY SELF-RELIANCE: EXECUTIVE SUMMARY
J. Cohn and R. Stayton 1982 12 p
(Grant NSF OSS-80-16323)
(PB83-136978; NSF/OSS-82004) Avail: NTIS HC A02/MF A01 CSCL 10A

A grassroots energy conservation project which involved more than 3100 residents of Santa Cruz, California, is discussed. Citizens attended forums and town meetings to suggest ideas for solving the community's energy problems. These ideas were then evaluated by the Energy Future Advisory Board and compiled into the Energy Future Plan. The plan covers such topics as new residences, residential retrofit, automobile efficiency, farm efficiency, commercial greenhouses, local food production, commercial efficiency, land use planning, energy eduction and financing, and solar, wind, and ocean energy. If the plan is successfully implemented, the energy that the community is projected to use in 1991 can be lowered by 24 to 35 percent. GRA

N83-27475# Resource Transitions, Inc., Santa Cruz, Calif.
ENERGY FUTURE SANTA CRUZ: A CITIZENS' PLAN FOR ENERGY SELF-RELIANCE
J. Cohn and R. Stayton 1982 104 p refs

(Grant NSF OSS-80-16323)
(PB83-136960; NSF/OSS-82003) Avail: NTIS HC A06/MF A01 CSCL 10A

The results of a grassroots energy conservation project which involved more than 3,100 residents of Santa Cruz, California, is discussed. Citizens attended forums and town meetings to suggest ideas for solving the community's energy problems. These ideas were then evaluated by the Energy Future Advisory Board and compiled into the Energy Future Plan. The energy plan covers such topics as new residences, residential retrofit, automobile efficiency, farm efficiency, commercial greenhouses, local food production, commercial efficiency, land use planning, energy education and financing, and solar, wind, and ocean energy. An energy implementation guide and glossary are included.
Author (GRA)

N83-27476# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
AERODYNAMIC RESEARCH ON TIPVANE WINDTURBINES
G. J. W. vanBussel, Th. vanHolten, and G. A. M. vanKuik Apr. 1982 19 p refs
(PB83-147413; LR-355) Avail: NTIS HC A02/MF A01 CSCL 10B

The research on tipvane turbines aims at a process improvement of the wind energy conversion system, which is more than component improvement such as efficient aerofoils and optimized transmission systems. These latter developments make it possible for a modern wind turbine to approach the Betz maximum power coefficient. However, process improvements are possible based on flow phenomena which are not consistent with the assumptions made in Betz theory. Power coefficients far above the Betz maximum value are possible when for example forces are applied perpendicular to the winddirection and when viscous effects play an important role. The effect of tipvanes, which are small auxiliary wings at the end of the turbine blades inducing a mass flow augmentation by the creation of a venturi flow is investigated.
GRA

N83-27763# Atomic Energy of Canada Ltd., Chalk River (Ontario). Accelerator Physics Branch.
POST COUPLER STUDIES FOR ALVAREZ TANKS TO BE USED FOR HIGH POWER OR VARIABLE ENERGY
J. Ungrin, S. O. Schriber, and R. A. Vokes *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 183-186 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N83-27477 Institut Geographique National, Paris (France).
MAPPING FROM SPACE AND THE SPOT PROJECT
Alain Baudoin 1981 30 p refs
Copyright. Avail: Issuing Activity

Examples of operations concerning the study of a part of the French litoral using LANDSAT images are reviewed, and the manner in which the SPOT satellite space data will be used for cartography is discussed. Operating experience with LANDSAT imagery includes mosaics of images obtained by photographic or digital preprocessing, photomaps corrected geometrically, thematic classifications based on digital data, and updating cartographic digital files. The SPOT parameters and characteristics are discussed. The geometric preprocessing of SPOT imagery is described. The main SPOT cartographic applications are detailed including the revision of medium-scale maps and the computation of digital terrain models and plot contours in areas where only small scale maps exist.
Author (ESA)

N83-27478# Council for Scientific and Industrial Research, Pretoria (South Africa). Atmospheric Sciences Div.
DIF1: A DISPERSION PROGRAM WHICH CAN HANDLE POLLUTION AND REFLECTION [DIF1: 'N DISPERSIEPROGRAM WAT VERSTIKKING EN VEELVULDIGE WEERKAATSINGS KAN HANTEER]
O. L. Fourie and J. C. Venter Mar. 1982 67 p refs In AFRIKAANS; ENGLISH summary
(ATMOS/82/11) Avail: NTIS HC A04/MF A01

When a nocturnal inversion is broken by turbulent convection which results from heating of the earth's surface, a pollutant plume will be mixed downward and a fumigation condition with high pollutant concentration will arise. When an elevated inversion exists above the mixing layer, the pollutant plume undergoes multiple reflections which influence pollutant concentration levels. The dispersion program DIF considers these two phenomena. The extended program DIF1 is described.
Transl. by E.A.K.

N83-27479# Miller and Miller, Inc., Orlando, Fla.
LARGE-SCALE OPERATIONS MANAGEMENT TEST OF USE OF THE WHITE AMUR FOR CONTROL OF PROBLEM AQUATIC PLANTS. PART 4. THIRD YEAR POSTSTOCKING RESULTS. VOLUME 6. THE WATER AND SEDIMENT QUALITY OF LAKE CONWAY, FLORIDA
H. Douglas Miller and James Boyd Jan. 1983 56 p 8 Vol.
(Contract DACW39-76-C-0084)
(AD-A124443; WES/MP/EL-TR-A-78-2-4-VOL-6) Avail: NTIS HC A04/MF A01 CSCL 06/6

This report presents the results of the third annual poststocking period covering the 12-month period from September 1979-August 1980. The data collected during this period are compiled herein in a format similar to that used for the baseline report and the two previous poststocking reports. The compiled poststocking data are compared to the baseline conditions to determine if any significant changes have occurred as a result of the introduction of the white amur into Lake Conway. Subsequent to the introduction of the white amur, both total filterable and total unfilterable phosphorus underwent significant downward trends that presently appear to be becoming stable. Conversely, the gradual upward trend of chlorophyll-a continued during this period. Sediment quality data showed several changes from the baseline period. The mean total phosphorus concentration decreased 56 percent as compared to the baseline period. Conversely, mean copper and lead concentrations increased above baseline values.
Author (GRA)

N83-27480# Army Mobility Equipment Research and Development Command, Fort Belvoir, Va.
PLATING WASTES SURVEY Final Report
P. Gail Chester Nov. 1982 77 p refs
(DA Proj. 1L1-62720-D-048)
(AD-A125230; MERADCOM-2374) Avail: NTIS HC A05/MF A01 CSCL 07/4

Twenty-three DARCOM installations perform plating and other metal finishing operations covered by EPA's Plating Wastewater Pretreatment regulations. Wastewater flows vary from less than 100 gallons per day to over 150,000 gallons per day. In many cases, common problems exist. Disposal of sludges and concentrated process solutions are becoming more costly and time-consuming. Rinsewater volume controls in the plating shop are seldom satisfactory. In this report, the similarities and differences reported by the 23 installations are described, providing a data base of DARCOM plating wastewater treatment. Subjects discussed include the variety in metals plated, volumes of wastewater flow, and efficiency of operations. Similarities are noted in basic treatment methods, in lack of recycle and recovery systems, and in problem areas. Actual DARCOM plating wastewater treatment is described. Problems and successes of these shops are cited. Where appropriate, conclusions are drawn and suggestions are made.
GRA

N83-27481# Pacific Northwest Lab., Richland, Wash.
PACIFIC NORTHWEST LABORATORY REPORT TO THE DOE OFFICE OF ENERGY RESEARCH. PART 2: ENVIRONMENTAL SCIENCES Annual Report, 1982
C. M. Novich, ed. Feb. 1983 59 p refs 5 Vol.

(Contract DE-AC06-76RL-01830)
(DE83-007586; PNL-4600-Pt-2) Avail: NTIS HC A04/MF A01

Progress in environmental sciences is reported. The following research areas are highlighted: terrestrial and riverine ecology; marine sciences; radionuclide fate and effects; ecological effects of coal conversion; solid waste; mobilization fate and effects; and statistical and theoretical research. For individual titles, see N83-27482 through N83-27487.

N83-27482# Pacific Northwest Lab., Richland, Wash.
TERRESTRIAL AND RIVERINE ECOLOGY
In its Pacific Northwest Lab. Rept. to the DOE Office of Energy Res. Feb. 1983 p 4-10 refs (For primary document see N83-27481 16-45)
Avail: NTIS HC A04/MF A01

The recovery time and rate of selected ecosystems from natural and man induced changes was investigated. The correlation between the presence of desert shrubs and large ant populations at radioactive waste sites was verified, and the effects of wildfire on the recovery of vegetation was examined. It is shown that sagebrush leaves selectively take up some toxic elements produced by coal combustion. A freshwater study shows that changes in a river's water level that lead to dewatering are more harmful to salmon alevins than to eggs. DOE

N83-27483# Pacific Northwest Lab., Richland, Wash.
MARINE RESEARCH
In its Pacific Northwest Lab. Rept. to the DOE Office of Energy Res. Feb. 1983 p 11-16 refs (For primary document see N83-27481 16-45)
Avail: NTIS HC A04/MF A01

Coastal marine ecosystems will absorb increasing quantities of energy related contaminants as energy facilities are developed and expanded. Some contaminants are released in controlled effluents, but others may be discharged accidentially. In either case, the environment must be protected from potentially adverse effects. The transformation processes and long term fate of numerous pollutants and measuring physical, chemical, and biological recovery rates were investigated. Determination of how biota are initially affected by exposure to metal and hydrocarbons is outlined. The origins and concentrations of trace metals within the surface microlayer, the underlying water column, and bottom sediment are examined. Input from energy related activities and its effect on the upset of the balance of natural processes which lead to the degradation of coastal ecosystems is determined. DOE

N83-27484# Pacific Northwest Lab., Richland, Wash.
ECOLOGICAL EFFECTS OF COAL CONVERSION
In its Pacific Northwest Lab. Rept. to the DOE Office of Energy Res. Feb. 1983 p 17-22 refs (For primary document see N83-27481 16-45)
Avail: NTIS HC A04/MF A01

The distributional kinetics, biological transformation, and ecological effects of complex organic materials after they are released to aquatic and terrestrial ecosystems were investigated. Potential for bioaccumulation and transfer through food chains leading to people is examined. It is indicated that coal liquids are more toxic than petroleum based fuel oils. The organic materials found in synthetic fuels and in other energy sources have a wide range of physical and chemical properties. Special methods of handling the materials presenting them to test systems, and analyzing their chemical composition are developed. The methods include chromographic separations and identification of organic constituents of coal liquids, flow through aquatic bioassays, and hydroponic and lysimeter evaluation of plant exposures. Bioassays, behavioral testing, and microcosm studies, identify and assess organism and ecosystem and their response to stress and to the effects of complex hydrocarbons. DOE

N83-27485# Pacific Northwest Lab., Richland, Wash.
SOLID WASTES: MOBILIZATION, FATE AND EFFECTS
In its Pacific Northwest Lab. Rept. to the DOE Office of Energy Res. Feb. 1983 p 23-25 refs (For primary document see N83-27481 16-45)
Avail: NTIS HC A04/MF A01

The establishment of a scientific basis for predicting water and solute movement and the biological availability of solutes in solid wastes disposed of to the ground was considered. The effect of weathering and residence time on the mobility of inorganic and organic pollutants from permanent waste sites, and how these pollutants affect aquatic and terrestrial environments is established. The information helps establish more precise engineering criteria for solid waste disposal, and procedures for mitigating possible long term effects. DOE

N83-27486# Pacific Northwest Lab., Richland, Wash.
RADIONUCLIDE FATE AND EFFECTS
In its Pacific Northwest Lab. Rept. to the DOE Office of Energy Res. Feb. 1983 p 26-32 refs (For primary document see N83-27481 16-45)
Avail: NTIS HC A04/MF A01

The full range of contaminant behavior and fate, from the initial physicochemical factors that govern radionuclide availability in terrestrial and aquatic environments to studies of contaminant transport by biological means were reported. The biologically and chemically mediated transport processes and food chain pathways are emphasized rather than the purely physical forms of contaminant transport, such as transport by wind and water. DOE

N83-27487# Pacific Northwest Lab., Richland, Wash.
STATISTICAL AND THEORETICAL RESEARCH
In its Pacific Northwest Lab. Rept. to the DOE Office of Energy Res. Feb. 1983 p 33-38 refs (For primary document see N83-27481 16-45)
Avail: NTIS HC A04/MF A01

The creation of field designs to detect population impacts, new census procedures for small mammals, and methods for designing studies to determine where and how much of a contaminant is extent over certain landscapes is discussed. An analytical method for predicting the success of field experiments on wild populations is described. It is discovered that population of free roaming horse herds can double in 4 years and that grizzly bear populations may be substantially smaller than once thought. Stray horses become a public nuisance and it is important to determine their number. A similar statistical theory can be applied to other situations where wild animals are a problem of concern to other government agencies. DOE

N83-27488# Pacific Northwest Lab., Richland, Wash.
PACIFIC NORTHWEST LABORATORY REPORT TO THE DOE OFFICE OF ENERGY RESEARCH. PART 3: ATMOSPHERIC SCIENCES Annual Report, 1982
E. L. Owczarski, ed. Feb. 1983 64 p refs 5 Vol.
(Contract DE-AC06-76RL-01830)
(DE83-007472; PNL-4600-Pt-3) Avail: NTIS HC A04/MF A01

Atmospheric processes; pollutant characterization and transformation; boundary layer meteorology, and dispersion, deposition, and resuspension of atmospheric pollutants are discussed. For individual titles, see N83-27489 through N83-27497.

N83-27489# Pacific Northwest Lab., Richland, Wash.
TRANSFORMATION OF ENERGY-RELATED POLLUTANTS
In its Pacific Northwest Lab. Rept. to the DOE Office of Energy Res. Feb. 1983 p 1-4 refs (For primary document see N83-27488 16-45)
Avail: NTIS HC A04/MF A01

Measuring chemical transformation rates of polycyclic aromatic compounds emitted by fossil-fueled power plants; correlating transformation rates of these compounds with distance from the source, ambient temperature, light intensity and concentrations of other reactant species, such as nitrogen oxides and ozone; and evaluating the results of laboratory studies on discrete reaction steps in the overall transformation processes and addressed. DOE

N83-27490# Pacific Northwest Lab., Richland, Wash.
ATMOSPHERIC DIFFUSION IN COMPLEX TERRAIN

In its Pacific Northwest Lab. Rept. to the DOE Office of Energy Res. Feb. 1983 p 9-14 ref (For primary document see N83-27488 16-45)
Avail: NTIS HC A04/MF A01

Defining and developing a long-range technical plan for studying the transport and diffusion of pollutant particles and gases over complex landforms; assisting a multilaboratory program studying diffusion in complex terrain by providing methodologies and techniques of analyses for transport and diffusion over a variety of complex landforms; and evaluating and developing various transport and dispersion models for complex terrain are discussed. DOE

N83-27491# Pacific Northwest Lab., Richland, Wash.
ATMOSPHERIC BOUNDARY LAYER STUDIES
In its Pacific Northwest Lab. Rept. to the DOE Office of Energy Res. Feb. 1983 p 15-17 refs (For primary document see N83-27488 16-45)
Avail: NTIS HC A04/MF A01

Investigating the meteorological characteristics of the planetary boundary layer that pertain to pollutant transport and dry removal; analyzing the transport and diffusion of pollutants in complex terrain, particularly in The Geysers Geothermal Area of California; and constructing simple models for the prediction of the depth, speed and direction of gravity-controlled drainage flows and pollutant dispersion within these flows. DOE

N83-27492# Pacific Northwest Lab., Richland, Wash.
ATMOSPHERIC DIFFUSION IN COMPLEX TERRAIN
In its Pacific Northwest Lab. Rept. to the DOE Office of Energy Res. Feb. 1983 p 23-29 refs (For primary document see N83-27488 16-45)
Avail: NTIS HC A04/MF A01

Defining and developing a long-range technical plan for studying the transport and diffusion of pollutant particles and gases over complex landforms; assisting a multilaboratory program studying diffusion in complex terrain by providing methodologies and techniques of analyses for transport and diffusion over a variety of complex landforms; and evaluating and developing various transport and dispersion models for complex terrain are discussed. DOE

N83-27493# Pacific Northwest Lab., Richland, Wash.
ATMOSPHERIC BOUNDARY LAYER STUDIES
In its Pacific Northwest Lab. Rept. to the DOE Office of Energy Res. Feb. 1983 p 31-32 refs (For primary document see N83-27488 16-45)
Avail: NTIS HC A04/MF A01

Investigating the meteorological characteristics of the planetary boundary layer that pertain to pollutant transport and dry removal; analyzing the transport and diffusion of pollutants in complex terrain, particularly in The Geysers Geothermal Area of California; and constructing simple models for the prediction of the depth, speed and direction of gravity-controlled drainage flows and pollutant dispersion within these flows. DOE

N83-27494# Pacific Northwest Lab., Richland, Wash.
AIR POLLUTION DRY DEPOSITION: RADIOISOTOPES AS PARTICLES AND VOLATILES
In its Pacific Northwest Lab. Rept. to the DOE Office of Energy Res. Feb. 1983 p 33-36 refs (For primary document see N83-27488 16-45)
Avail: NTIS HC A04/MF A01

An experimental basis for models predicting removal of airborne particles and gases by dry deposition onto outdoor surfaces; predictive models accounting for the influence of particle size, gas characteristics, wind velocity, deposition surface, and other variables on deposition rates; and determining deposition rates using dual tracer techniques in the field and in a wind tunnel in the laboratory are discussed. DOE

N83-27495# Pacific Northwest Lab., Richland, Wash.
OIL SHALE FUGITIVE AIR EMISSIONS
In its Pacific Northwest Lab. Rept. to the DOE Office of Energy Res. Feb. 1983 p 37-40 refs (For primary document see N83-27488 16-45)
Avail: NTIS HC A04/MF A01

Evaluating fugitive airborne particulate and gaseous emissions from the present and future oil shale activities; investigating emissions from minning, transportation, material handling, crushing, retorting, and spent shale disposal sites; and identifying and classifying pollutants such as carbon monoxide, hydrogen sulfide, oxides of nitrogen, ozone, sulfur dioxide, hydrocarbons, and suspended particles are discussed. DOE

N83-27496# Pacific Northwest Lab., Richland, Wash.
PARTICLE RESUSPENSION AND TRANSLOCATION
In its Pacific Northwest Lab. Rept. to the DOE Office of Energy Res. Feb. 1983 p 41-44 refs (For primary document see N83-27488 16-45)
Avail: NTIS HC A04/MF A01

Investigating particle resuspension rates and air concentration as functions of atmospheric stresses, local soil-working stresses, particle variables and surface variables; developing an experimental resuspension data base to aid in establishing surface contamination limits to assure adequate public protection from hazardous materials; and factoring time-varying resuspension rates into models describing delivery of surface contaminants to man are discussed. DOE

N83-27497# Pacific Northwest Lab., Richland, Wash.
THEORETICAL STUDIES AND APPLICATION
In its Pacific Northwest Lab. Rept. to the DOE Office of Energy Res. Feb. 1983 p 49-60 refs (For primary document see N83-27488 16-45)
Avail: NTIS HC A04/MF A01

Developing theoretical models to characterize and describe the fate of energy-related air pollutants; and translating theory and data into forms most useful for practical application in evaluating the consequences of air pollutant releases are discussed. DOE

N83-27498# Little (Arthur D.), Inc., Cambridge, Mass.
RESPONSES OF AIRBORNE BIOTA TO MICROWAVE TRANSMISSION FROM SATELLITE POWER SYSTEM Final Report
3 Jun. 1982 430 p refs
(Contracts DE-AI01-79ER-10060; EPA-78-R-X-0337-1)
(DE83-006495; DOE/ER-10060/T1; MB3006495) Avail: NTIS HC A19/MF A01

As part of an assessment of environmental impacts of the Satellite Power System (SPS), the behavioral responses of birds to microwave radiation was studied. Experiments were conducted in both field and laboratory environments. Molting, foraging behavior, reproductive behavior, embryonic development, and flight behavior were examined. DOE

N83-27499# Oak Ridge National Lab., Tenn.
USE OF DOE/RECON IN ENVIRONMENTAL PROTECTION
W. A. Alexander 1982 4 p refs Presented at UCC-ND and GAT Environ. Protection Seminar, Gatlinburg, Tenn., 5 Apr. 1982
(Contract W-7405-eng-26)
(DE82-017506; CONF-820418-21) Avail: NTIS HC A02/MF A01

DOE/RECON is an interactive on-line information retrieval system which provides users rapid and easy access to a wide range of information. The DOE/RECON system is operated by the Technical Information Center in Oak Ridge, Tennessee for the United States Department of Energy. The Technical Information Center develops and manages the Department of Energy's technical information program which includes DOE-originated information as well as world-wide literature on scientific and technical advances in the energy field. To manage and make available this large amount of information, the Technical Information Center builds and maintains computerized data bases and disseminates this information via computerized retrieval systems. DOE

N83-27500# Argonne National Lab., Ill. Chemical Technology Div.
SULFUR CONTROL IN FLUIDIZED-BED COMBUSTORS: METHODOLOGY FOR PREDICTING THE PERFORMANCE OF LIMESTONE AND DOLOMITE SORBENTS
Darrell C. Fee, Kevin M Myles, W. Ira Wilson, Liang-Shih Fan (Ohio State Univ.), Gregory W. Smith, Samuel H. Wong, John A. Shearer, John F. Lenc, and Irving Johnson Sep. 1982 448 p refs Supersedes ANL/CEN/FE-80-10
(Contract W-31-109-eng-38)
(DE83-007658; ANL/FE-80-10; ANL/CEN/FE-80-10) Avail: NTIS HC A19/MF A01

The ANL methodology which significantly simplifies predictions of sulfur capture in fluidized bed coal combustors is discussed. The use of the methodology predictions is summarized. The details of the method development and supporting data are given and comparisons between predicted sorbent performance and actual FBC plant data show to support the methodology. The method describes the experimental results and can be used with some confidence to compare sorbent performance, provided that the limitations of the methodology are recognized. DOE

N83-27501# Argonne National Lab., Ill. Chemical Technology Div.
SULFUR CONTROL IN FLUIDIZED-BED COMBUSTORS: METHODOLOGY FOR PREDICTING THE PERFORMANCE OF LIMESTONE AND DOLOMITE SORBENTS. ADDENDUM. COMPILATION OF SORBENT PERFORMANCE DATA FROM ATMOSPHERIC FLUIDIZED-BED COMBUSTORS
Darrell C. Fee, Kevin M. Myles, W. Ira Wilson, Liang-Shih Fan (Ohio State Univ.), Gregory W. Smith, Samuel H. Wong, John A. Shearer, John F. Lenc, and Irving Johnson Sep. 1982 99 p refs
(Contract W-31-109-eng-38)
(DE83-007659; ANL/FE-80-10-Add.) Avail: NTIS HC A05/MF A01

Tabulated experimental data on sorbent utilization in fluidized bed combustors are measured. The data were extracted from a review of literature, dealing mainly with combustors greater than 18 in. in diameter. The tables include data on experimental variables, sorbent properties, coal properties, and the physical arrangement of the combustor. The format is designed to minimize the amount of data which must be entered for each experiment by making extensive use of libraries of the information, each common to may individual experiments. DOE

N83-27502# Oak Ridge National Lab., Tenn.
METEOROLOGICAL EFFECTS OF THERMAL ENERGY RELEASES (METER) PROGRAM Progress Report, Oct. 1980 - Sep. 1982
A. A. N. Patrinos and H. W. Hoffman Mar. 1983 98 p refs
(Contract W-7405-eng-26)
(DE83-008313; ORNL/TM-8603) Avail: NTIS HC A05/MF A01

This report examines the inadvertent weather modification effects of large cooling towers and cooling ponds. Emphasis was placed on field studies, and the focus of the program was on a precipitation modification study around the Bowen Electric Generating Plant in northwestern Georgia. The field effort includes the study of wetfall chemistry in the plant's vicinity. The analysis of three years of precipitation data have failed to show a significant effect of the plant on rainfall volume; the investigation of rainfall pattern variability has been inconclusive. The studies of wetfall chemistry have provided valuable information on the mechanisms of plume washout from large point sources and on the general characteristics of precipitation chemistry in the southeastern US. DOE

N83-27503# Department of Energy, Washington, D. C. Employee Development and Training Div.
ENVIRONMENTAL SAFETY AND HEALTH REQUIREMENTS. INTERMEDIATE LEVEL SKILLS TRAINING PROGRAM
Apr. 1982 230 p
(DE82-013800; DOE/MA-0029) Avail: NTIS HC A11/MF A01

This instructional text for a 5-day course is designed to develop intermediate level skills for DOE compliance with the National Environmental Policy Act and the Occupational Safety and Health Act. DOE

N83-27504# Oak Ridge National Lab., Tenn.
PROCESSES OF ATMOSPHERIC DEPOSITION OF METALS AND ACIDS TO FORESTS
Steven E. Lindberg, Ralph R. Turner, and Gary M. Lovett 1982 14 p refs Presented at the 7th Ann. Meeting on the Air Pollution Control Assoc., New Orleans, 20 Jun. 1982
(Contract W-7405-eng-26)
(DE82-017442; CONF-820627-11) Avail: NTIS HC A02/MF A01

We quantified the atmospheric deposition of the water leachable fractions of trace metals to upper canopy foliage, determined the major mechanisms of deposition, and assessed the interactions between deposited metals and acid rain for several forested areas. Atmospheric sources contributed significantly to the annual flux of these elements to the forest floor in Walker Branch Watershed, Tennessee; deposition supplied from 14% (Mn) to approximately 40% (Cd, Zn) to approximately 99% (Pb) to this flux. The measured water solubility of these metals in suspended and deposited particles indicated that they may be readily dissolved following deposition; however, only Pb appeared to be absorbed directly at the leaf surface. Dry deposition constituted a major fraction of the total annual atmospheric input of Cd and Zn (approximately 20%), Pb, (approximately 55%), and Mn (approximately 90%). In southern forests, interactions between dry deposition and acid rain can result in concentrations of metals and H + on leaves considerably higher than in rain alone. DOE

N83-27505# West Virginia Univ., Morgantown. Dept. of Mechanical and Aerospace Engineering.
LITERATURE REVIEW OF SAMPLING PROBES. PHASE 5: PROBE INLET DESIGN Interim Report
S. A. Lutz and R. A. Bajura May 1982 82 p refs
(Contract DE-AM21-79MC-11284)
(DE82-017327; DOE/MC-11284/T15) Avail: NTIS HC A05/MF A01

A comprehensive review of particulate sampling is presented. The previous work is categorized as: (1) sampling from a flowing process stream, (2) atmospheric sampling, and (3) filter modeling. Empirical and theoretical studies are treated separately. An assessment is presented from which problem areas are identified. Recommendations are given for future work in particulate sampling in flowing process streams. DOE

N83-27506# Argonne National Lab., Ill. Energy and Environmental Systems Div.
FLUIDIZED-BED COMBUSTION: A REVIEW OF ENVIRONMENTAL ASPECTS
Bill R. Hubble Jun. 1982 92 p refs
(Contract W-31-109-eng-38)
(DE82-021238; ANL/ECT-12) Avail: NTIS HC A05/MF A01

Potential environmental problems associated with fluidized bed combustion (FBC) are discussed and areas where additional research and development effort is required are identified. Environmental data from commercial scale (e.g., industrial demonstration) units are needed before an adequate environmental assessment of FBC can be made. With respect to solid waste disposal, the available data indicate that solid wastes generated by FBC will not likely be deemed hazardous; FBC wastes should meet current standards for sanitary landfills, including the requirement that ground water at the disposal boundary meet the National Interim Primary Drinking Water Regulations; and problems with respect to pH, total dissolved solids, and sulfate could exist if the National Secondary Drinking Water Regulations are included in sanitary landfill regulations. DOE

N83-27507# Brookhaven National Lab., Upton, N. Y. Environmental Chemistry Div.
ORGANIC AIR POLLUTANTS: SETTING PRIORITIES FOR LONG TERM RESEARCH NEEDS

J. S. Gaffney Apr. 1982 79 p refs Workshop held at Gettysburg, Pa., 19-23 Apr. 1982
(Contract DE-AC02-76CH-00016)
(DE83-005997; BNL-51605) Avail: NTIS HC A05/MF A01

Current and future research dealing with the environmental and biomedical concern of organic air pollutants were outlined and prioritized. The following four main areas of research are addressed: (1) chemical and physical characterization of source emissions and ambient levels of organic pollutants; (2) atmospheric chemical and physical transformations (homogeneous and heterogeneous) of organic pollutants; (3) biochemical testing procedures to determine potential biological and human health impacts; and (4) air quality, dispersion simulation and source/receptor modeling as tools in assessing potential biomedical and geophysical impacts of organic air pollutants. DOE

N83-27508# Argonne National Lab., Ill.
IMPLICATIONS OF EMERGING ENVIRONMENTAL-CONTROL TECHNOLOGIES FOR AIR-POLLUTION REGULATIONS
C. D. Livengood, R. D. Doctor, P. S. Farber, B. R. Hubble, J. A. Lecky, D. G. Streets, and H. S. Huang Nov. 1982 62 p refs
(Contract W-31-109-eng-38)
(DE83-005901; ANL/EES-TM-205) Avail: NTIS HC A04/MF A01

Control technologies applicable to coal fired energy systems are reviewed. Potential for improved emissions control or more economical control or both is noted to identify areas thay may give rise to future ECT issues. The discussion is limited to technologies for control of sulfur dioxide (SO2), nitrogen oxides (NO/sub x/), and particulate matter. The scope of the report is limited in several areas to what are the more promising technologies. DOE

N83-27509# Pacific Northwest Lab., Richland, Wash.
NEW POLLUTANT DISPERSION MODEL FOR APPLICATION IN MOUNTAIN VALLEYS
C. D. Whiteman and K. J. Allwine Nov. 1982 11 p refs Presented at APCA Pacific Northwest Intern. Section Ann. Meeting, Vancouver, British Columbia, 15 Nov. 1982
(DE83-005289; PNL-SA-10607; CONF-821131-2) Avail: NTIS HC A02/MF A01

A valley air quality model is described with discussions on model parameters, model structure, inputs and outputs. A sample simulation is presented for Columbia River Valley near Trail, B.C. DOE

N83-27510# Pittsburgh Univ., Pa. Dept. of Chemical and Petroleum Engineering.
EFFICIENCY OF BUFFERED AQUEOUS CARBOXYLIC ACID SOLUTIONS AND ORGANIC SOLVENTS TO ABSORB SO2 FROM INDUSTRIAL FLUE; SOLUBILITY DATA FROM GAS-LIQUID CHROMATOGRAPHY M.S. Thesis
Gregory J. Sanza 1982 159 p refs
(Contract DE-FG22-80PC-30309)
(DE83-005405; DOE/PC-30309/T3) Avail: NTIS HC A08/MF A01

Nine adsorbents were examined. These potential candidates for flue gas desulfurization included 1-methyl-2-pyrrolidinone, tri-n-butyl phosphate (TBP), both 0.5 M and 1.0 M solutions of cittric acid and glycolic acid, buffered to pH's of 4.5 and 3.8, and pure water. Infinite dilution activity coefficients of SO2 were obtained by gas-liquid chromatography in a trial solvent of Nitrobenzene, and then in systems of 1-methyl-2-pyrrolidinone and TBP, independently. The solubility data of SO2 was derived and found to be comparable to data obtained from a classical bubble-sparger apparatus. Solubility data was then programmed into an absorber-stripper computer simulator in order to calculate the various concentration and temperature profiles that would exist, the degree of desulfurization, and the steam consumption for all nine systems. Concentrated solutions of citric acid buffered to a low pH exhibited the most favorable conditions for application in direct steam regeneration processes. 1-methyl-2-pyrrolidinone yielded better performance than TBP did with high-pressure indirect steam used for stripping. DOE

N83-27511# PEDCO-Environmental Specialists, Inc., Cincinnati, Ohio.
ACID RAIN: CONTROL STRATEGIES FOR COAL-FIRED UTILITY BOILERS, VOLUME 1
M. Szabo, Y. Shah, and J. Abraham May 1982 104 p refs
(Contract DE-AC21-81MC-16361)
(DE83-006695; DOE/METC-82/42-Vol-1) Avail: NTIS HC A06/MF A01

An evaluation of the cost and effectiveness of conventional controls for emissions of sulfur oxides (SO/sub x/) and nitrogen oxides (NO/sub x/) from coal fired utility boilers is presented. The plant specific data can be used to verify other cost effectiveness models. The methodology and results of this evaluation have were used for review of assumptions and cost estimates. It is assumed that coal fired utility power plants in the midwestern United States are the major contributors to the acid rain problem in the Northeast. It is concluded that reducing SO/sub x/ and NO/sub x/ emissions from midwestern coal fired power plants may not significantly reduce the acidity of rain, even at the cost of billions of dollars for controls. Local sources of SO/sub x/ and NO/sub x/, chiefly oil fired boilers and automobiles in the Northeast, may contribute more significantly to the acid rain occurring there than previously realized. DOE

N83-27512# Pittsburgh Univ., Pa. Industrial Applications Center.
ARIS: ACID RAIN INFORMATION SYSTEM Final Project Report
P. McWilliams and I. Musante 20 Apr. 1982 27 p
(Contract DE-FG22-80PC-30323)
(DE83-007026; DOE/PC-30323/T1) Avail: NTIS HC A03/MF A01

The ARIS provides the technical, government, and business communities with abstracted information from the world's significant technical and business literature. The subject areas covered by this acid rain data base includes: (1) the mechanism of the formation of acid rain; (2) its transport phenomena; (3) its effects on materials; (4) its effects on plants; (5) the health effects of acid rain; and (6) monitoring and analysis of acid rain. Data in ARIS comes from several government and commercial data base procedures, and these include BDB DOE energy database, environmental science index, air pollution abstracts, national technical service (NTIS), and articles of regional interests from various newspapers. The types of publication source documents are: technical journals, conference proceedings, selected monographs, government reports, special studies, and newspapers. The file data is proposed to be updated quarterly and will cover selected references from 1970 with major focus on material after 1976. DOE

N83-27513# Los Alamos Scientific Lab., N. Mex. Environmental Surveillance Group.
QUALITY ASSURANCE FOR ENVIRONMENTAL ANALYTICAL CHEMISTRY: 1981
Ernest S. Gladney, Daniel R. Perrin, Colleen E. Burns, and Richard D. Robinson Nov. 1982 130 p refs
(Contract W-7405-eng-36)
(DE83-007102; LA-9579-MS) Avail: NTIS HC A07/MF A01

The continuing quality assurance effort by the Environmental Surveillance Group (H-8) is presented. Included are all standard materials now in use, their consensus or certified concentrations, and all quality assurance measurements made by H-8 during 1981. DOE

N83-27514# One America, Inc., Washington, D.C.
URBAN-WASTE PROGRAM RESEARCH AND DEVELOPMENT 1978-1981: AN OVERVIEW
Aug. 1982 93 p
(Contract DE-AC01-80CS-24312)
(DE82-019788; DOE/CS-24312/3) Avail: NTIS HC A05/MF A01

The DOE Urban Waste Program's research and development investments between Fiscal Year 1978 and the end of Fiscal Year 1981 are documented. The Sunset Review coverage is broadened

and expanded by reviewing all the project literature available. The status of all R and D projects undertaken during the past four years is shown. The following are covered: historical perspective, mechanical technologies, thermal technologies, biochemical technologies, wastewater and water treatment technologies, and generic research and development. DOE

N83-27515# Lulea Univ. (Sweden). Div. of Water Resources Engineering.
A MATHEMATICAL MODEL OF THE URBAN BOUNDARY LAYER
Aake Holmbom and Urban Svensson 1982 48 p refs
(Contract SWEDCBR-C-790159-2)
(TULEA-1982-09; Ser-A-85; ISSN-0347-0881) Avail: NTIS HC A03/MF A01

The effects of a sudden change in surface roughness under neutral or stratified atmospheric conditions on mean atmospheric flow and turbulence structure are numerically investigated. A system of partial differential equations is used. Model verification studies using laboratory measurements indicate that numerical prediction of flow over a simulated urban area is realistic. Author (ESA)

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

N83-27516*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
AURORAL KILOMETRIC RADIATION/AURORA CORRELATION
Robert F. Benson and Syun-Ichi Akasofu (Alaska Univ., Fairbanks) May 1983 36 p refs Presented at the Natl. Radio Sci. Meeting, Boulder, Colo., Jan. 1983 Submitted for publication
(NASA-TM-85035; NAS 1.15:85035) Avail: NTIS HC A03/MF A01 CSCL 04A

Auroral kilometric radiation (AKR) observations from the ISIS 1 topside sounder receiver were compared with visual auroral observations from the network of Alaskan all-sky camera stations. The goal was to relate AKR source region encounters to specific auroral forms on the same magnetic field line. Thirty-eight simultaneous data sets were identified and analyzed. In general, intense AKR was associated with bright auroral arcs and conditions of weak or no AKR corresponded to times when either no aurora or only a faint arc or weak diffuse aurora were observed. Five cases, when both intense AKR and bright visual aurora were present, were analyzed in detail. Complete electron density N sub e contours, from the satellite altitude down to the F region ionization peak, were obtained along N-S traversals of the AKR source region. In addition, the ISIS 1 orbital tracks were projected down the magnetic field lines to the auroral altitude and compared to auroral features on a map derived from the all sky camera images. Density cavities (regions where N sub e < 100/cu cm) were encountered on each of these passes. Author

N83-27517*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ORDINARY MODE AURORAL KILOMETRIC RADIATION, WITH HARMONICS, OBSERVED BY ISIS 1
Robert F. Benson May 1983 25 p refs Presented at the Natl. Radio Sci. Meeting, Boulder, Colo., Jan. 1983 Submitted for publication
(NASA-TM-85036; NAS 1.15:85036) Avail: NTIS HC A02/MF A01 CSCL 04A

Topside-sounder receiver observations by ISIS 1 that reveal examples of o-mode auroral kilometric radiation (AKR) are presented. They correspond to locations outside of the low density source region of intense AKR x-mode emission. The propagation modes are identified by comparing the natural radiation wave cutoffs with the local resonant and wave cutoff phenomena stimulated by the sounder transmitter. The o-mode AKR is the dominant emission in these regions of relatively high electron density, but it is considerably weaker than the intense x-mode AKR observed to emanate from low density cavities above the auroral regions. In addition to the fundamental o-mode, 2nd and 3rd harmonic bands of radiation have also been detected. Harmonics associated with these o-mode AKR are less intense than the harmonics associated with x-mode AKR. It is difficult to explain the variety of harmonic AKR observations (x as well as o-mode) based on present AKR theories. Author

N83-27518*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
IS THERE ANY CHLORINE MONOXIDE IN THE STRATOSPHERE?
M. J. Mumma, J. D. Rogers, T. Kostiuk, D. Deming, J. J. Hillman, and D. Zipoy (Maryland Univ., College Park) May 1983 16 p refs
(NASA-TM-85026; NAS 1.15:85026) Avail: NTIS HC A02/MF A01 CSCL 04A

A ground-based search for stratospheric 35-ClO was carried out using an infrared heterodyne spectrometer in the solar absorption mode. Lines due to stratospheric HNO3 and tropospheric OCS were detected at about 0.2% absorptance levels, but the expected 0.1% lines of ClO in this same region were not seen. We find that stratospheric ClO is at least a factor of seven less abundant than is indicated by in situ measurements, and we set an upper limit of 2.3x10 to the 13th molecules/sq cm at the 95% confidence level for the integrated vertical column density of ClO. Our results imply that the release of chlorofluorocarbons may be significantly less important for the destruction of stratospheric ozone (O3) than is currently thought. Author

N83-27519*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
RELATIONSHIPS BETWEEN FIELD-ALIGNED CURRENTS, ELECTRIC FIELDS AND PARTICLE PRECIPITATION AS OBSERVED BY DYNAMICS EXPLORER-2
M. Sugiura, T. Iyemori, R. A. Hoffman, N. C. Maynard, J. L. Burch, and J. D. Winningham May 1983 25 p refs
(NASA-TM-85025; NAS 1.15:85025) Avail: NTIS HC A02/MF A01 CSCL 04A

The relationships between field-aligned currents, electric fields, and particle fluxes are determined using observations from the polar orbiting low-altitude satellite Dynamics Explorer-2. It is shown that the north-south electric field and the east-west magnetic field components are usually highly correlated in the field-aligned current regions. This proportionality observationally proves that the field-aligned current equals the divergence of the height-integrated ionospheric Pedersen current in the meridional plane to a high degree of approximation. As a general rule, in the evening sector the upward field-aligned currents flow in the boundary plasma sheet region and the downward currents flow in the central plasma sheet region. The current densities determined independently from the plasma and magnetic field measurements are compared. Although the current densities deduced from the two methods are in general agreement, the degree and extent of the agreement vary in individual cases. Author

N83-27520*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SAM 2 MEASUREMENTS OF THE POLAR STRATOSPHERIC AEROSOL. VOLUME 3: OCTOBER 1979 TO APRIL 1980
M. Patrick McCormick and David Brandl (Systems and Applied Sciences Corp., Hampton, Va.) Jun. 1983 77 p refs
(NASA-RP-1106; L-15624; NAS 1.61:1106) Avail: NTIS HC A05/MF A01 CSCL 04A

The Stratospheric Aerosol Measurement (SAM) II sensor is aboard the Earth-orbiting Nimbus 7 spacecraft providing extinction measurements of the Antarctic and Arctic stratospheric aerosol with a vertical resolution of 1 km. Representative examples and weekly averages of aerosol data and corresponding temperature

profiles for the time and place of each SAM II measurement (Oct. 1979 through Apr. 1980) are presented. Contours of aerosol extinction as a function of altitude and longitude or time are plotted and weekly aerosol optical depths are calculated. Seasonal variations and variations in space (altitude and longitude) for both polar regions are easily seen. Typical values of aerosol extinction at the SAM II wavelength of 1.0 microns for this time period are 2 to 4 times .0001/km in the main stratospheric aerosol layer. Optical depths for the stratosphere are about 0.002 to 0.003, up slightly over normal background levels (due to the eruption of Sierra Negra, Nov. 1979). Polar stratospheric clouds at altitudes of about 22 km were observed during the Arctic winter. A ready-to-use format containing a representative sample of the third 6 months of data to be used in atmospheric and climatic studies is presented. Author

N83-27521# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
EQUATORIAL ELECTROJET MOVEMENTS AT HUANCAYO AND EUSEBIO (FORTALEZA) ON SELECTED QUIET DAYS
R. P. Kane and N. B. Trivedi May 1983 22 p refs Submitted for publication
(INPE-2740-PRE/319) Avail: NTIS HC A02/MF A01

The H and Z variations for the Five International Quiet Days, each in October 1978 and February 1979, were compared for Huancayo and Eusebio near Fortaleza. The H ranges at both the locations fluctuated idely but not parallel to each other, indicating violent, rapid space-time variations of the equatorial electrojet characteristics. The Z patterns were generally dissimilar at the two locations and indicated large scale latitudinal meandering of the electrojet center from day to day as also during the same day, even to the extent of coming overhead of the two locations, but not simultaneously. Author

N83-27522*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE IMPACT OF CONVENTIONAL SURFACE DATA UPON VAS REGRESSION RETRIEVALS IN THE LOWER TROPOSPHERE
Tay-How Lee, Dennis Chesters, and Anthony Mostek May 1983 80 p refs
(NASA-TM-83987; NAS 1.15:83987) Avail: NTIS HC A05/MF A01 CSCL 04A

Surface temperature and dewpoint reports are added to the infrared radiances from the VISSR Atmospheric Sounder (VAS) in order to improve the retrieval of temperature and moisture profiles in the lower troposphere. The conventional (airways) surface data are combined with the twelve VAS channels as additional predictors in a ridge regression retrieval scheme, with the aim of using all available data to make high resolution space-time interpolations of the radiosonde network. For one day of VAS observations, retrievals using only VAS radiances are compared with retrievals using VAS radiances plus surface data. Temperature retrieval accuracy evaluated at coincident radiosonde sites shows a significant impact within the boundary layer. Dewpoint retrieval accuracy shows a broader improvement within the lowest tropospheric layers. The most dramatic impact of surface data is observed in the improved relative spatial and temporal continuity of low-level fields retrieved over the Midwestern United States. Author

N83-27523# California Univ., Davis. Dept. of Civil Engineering.
USER'S MANUAL FOR MODCAL: BOUNDING SURFACE SOIL PLASTICITY MODEL CALIBRATION AND PREDICTION CODE, VOLUME 2
Jay S. DenNatale, Leonard R. Herrmann, and Yannis F. Defalias Feb. 1983 144 p refs
(Contract N62474-82-C-8276; YF02030301)
(AD-A124867; NCEL-CR-83.011-Vol-2) Avail: NTIS HC A07/MF A01 CSCL 08/13

In order to reduce the complexity of the model calibration process, a computer-aided automated procedure has been developed and tested. The computer code employs a Quasi-Newton optimization strategy to locate that set of parameter values which minimizes the discrepancy between the model predictions and the experimental observations included in the calibration data base. Through application to a number of real soils, the automated procedure has been found to be an efficient, reliable and economical means of accomplishing model calibration. Although the code was developed specifically for use with the Bounding Surface plasticity model, it can readily be adapted to other constitutive formulations. Since the code greatly reduces the dependence of calibration success on user expertise, it significantly increases the accessibility and usefulness of sophisticated material models to the general engineering community. GRA

N83-27524# Institute of Gas Technology, Chicago, Ill.
EFFECT OF CONFINING PRESSURE ON PORE VOLUME IN TIGHT SANDSTONES
K. Sampath May 1982 12 p refs
(Contract DE-AC19-78BC-00042)
(DE82-013573; DOE/BC-00042/40) Avail: NTIS HC A02/MF A01

The effect of confining pressure on the pore volume of some tight sandstones from the Uinta Basin, Utah, was investigated. A method based on the pressure-volume relationships of a gas was developed and used to measure pore volume reduction. The results were compared with the results obtained using the more common method that involves the measurement of liquid expelled from a saturated core and were found to be in good agreement. Pore volume compressibility of the samples studies is in the range of values reported by other investigators and ranges from .000002 to .00013 pv/pv/psi at a confining pressure of 5,000 psi. DOE

N83-27525# Los Alamos Scientific Lab., N. Mex.
CANDIDATE SITES FOR FUTURE HOT-DRY-ROCK DEVELOPMENT IN THE UNITED STATES
Fraser Goff and Edward R. Decker Dec. 1982 40 p refs
(Contract W-7405-eng-36)
(DE83-007103; LA-9625-HDR) Avail: NTIS HC A03/MF A01

Generalized geologic and other data are tabulated for 24 potential hot dry rock (HDR) sites in the contiguous United States. The data show that HDR resources occur in many geologic and tectonic settings. Potential reservoir rocks at each prospect are described and each system is categorized according to inferred heat sources. The Fenton Hill area in New Mexico is discussed in detail because this region may be considered ideal for HDR development. Three other prospectively valuable localities are described: The Geysers-Clear lake region in California, the Roosevelt Hot Springs area in Utah, and the White Mountains region in New Hampshire. These areas are singled out to illustrate the roles of significantly different geology and geophysics, reservoir rocks, and reservoir heat contents in possible HDR developments. DOE

N83-27526# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
BEER'S-LAW-BASED, SIMPLE SPECTRAL MODEL FOR DIRECT NORMAL AND DIFFUSE HORIZONTAL IRRADIANCE
Richard E. Bird Dec. 1982 41 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE83-008132; SERI/TR-215-1781) Avail: NTIS HC A03/MF A01

A spectral model for cloudless days that uses simple mathematical expressions and tabulated lock up tables to generate direct normal and diffuse horizontal irradiance is presented. The model is based on modifications to previously published simple models and comparisons with rigorous radiative transfer codes. This model is expected to be more accurate and to be applicable to a broader range of atmospheric conditions than previous simple models. The prime significance of this model is its simplicity, which allows it to be used on small desk top computers. The spectrum produced by this model is limited to 0.3 to 4.0 (SIGMA) wavelength with an approximate resolution of 10 nm. DOE

N83-27527# Sandia Labs., Albuquerque, N. Mex. Systems Research Div.

THE NATIONAL SEISMIC STATION
Paul A. Stokes Jun. 1982 40 p
(Contract DE-AC04-76DP-00789)
(DE82-018224; SAND-81-2134) Avail: NTIS HC A03/MF A01

The National Seismic Station was developed to meet the needs of regional or worldwide seismic monitoring of underground nuclear explosions to verify compliance with a nuclear test ban treaty. The Station acquires broadband seismic data and transmits it via satellite to a data center. It is capable of unattended operation for periods of at least a year, and will detect any tampering that could result in the transmission of unauthentic seismic data. DOE

N83-27528# Eidgenoessisches Institut fuer Reaktorforschung, Wuerenlingen (Switzerland).
CONCENTRATED SOLAR-FLUX MEASUREMENTS AT THE IEA-SSPS SOLAR-CENTRAL-RECEIVER POWER PLANT, TABERNAS - LAMERIA (SPAIN) Final Report
G. vonTobel, C. Schelders, and M. Real 1982 176 p refs
(Contract DE-AC04-76DP-00789)
(DE82-020000; DOE/NBM-202000; TR-2/82) Avail: NTIS HC A09/MF A01

A flux analyzing system (F.A.S.) was installed at the central receiver system of the SSPS project to determine the relative flux distribution of the heliostat field and to measure the entire optical solar flux reflected from the heliostat field into the receiver cavity. The functional principles of the F.A.S. are described. The raw data and the evaluation of the measurements of the entire helistat field are given, and an approach to determine the actual fluxes which hit the receiver tube bundle is presented. A method is described to qualify the performance of each heliostat using a computer code. The data of the measurements of the direct radiation are presented. DOE

N83-27529# Sandia Labs., Albuquerque, N. Mex.
DEPARTMENT OF ENERGY'S WESTERN GAS SANDS PROJECT MULTI-WELL EXPERIMENT UPDATE
A. B. Crawley (DOE), D. A. Northrop, and A. R. Sattler 1982 12 p refs Presented at the 57th AIME Soc. of Petrol. Engr. Ann. Tech. Conf. and Exhibition, New Orleans, 26 Sep. 1982
(Contract DE-AC04-76DP-00789)
(DE82-018291; SAND-82-1638C; CONF-820927-5) Avail: NTIS HC A02/MF A01

The Department of Energy has initiated a Multi-well Experiment with the objectives: (1) characterization of low permeability, lenticular gas sands and (2) evaluation of state-of-the-art and developing technology for their production. The location is in the Rulison Field in the Piceance Basin, Garfield County, Colorado where the lenticular Mesaverde sequence and the underlying blanket Corcoran-Cozzette are the formations of interest and lie at depths between 4000 and 8600 ft. This paper is a survey of the findings to date. It includes a discussion of a study of the most relative outcrops; the drilling program; core analysis; and well-to-well correlation of the geology. Two wells have been drilled, the first was continuously cored through the Mesaverde section from 4310 to 6820 ft. In the second well, 950 ft of core was taken, which includes all the zones of interest for simulation experiments. Significant overpressuring was encountered and a large number of fractures were observed in the core. DOE

N83-27530# Sandia Labs., Albuquerque, N. Mex.
SEDIMENTOLOGY OF THE MESAVERDE FORMATION OF RIFLE GAP, COLORADO AND IMPLICATIONS FOR GAS-BEARING INTERVALS IN THE SUBSURFACE
J. C. Lorenz Mar. 1982 46 p refs
(Contract DE-AC04-76DP-00789)
(DE82-013396; SAND 92-0604) Avail: NTIS HC A03/MF A01

The exposures of the Mesaverde Formation at Rifle Gap, Colorado, are of a regressive series of marine to fluvial deposits about 1650 m (5000 ft) thick. Grading up out of the marine mancos Shale, the blanket shoreline sandstones of the Corocoran, Cozzette, and Rollins Sandstones record substages of the regression as data lobes were activated and abandoned in northwestern Colorado during Late Cretaceous time. The overlying goaks, sandstones, and carbonaceous mudstones were deposited on the paludal lower delta plain behind the shoreline. Meandering fluvial systems prograded over the paludal deposits. These systems deposited point-bar sandstones and overbank mudstones and siltstones in composite meander-belt trends, some of which are now gas-bearing, low-permeability reservoirs. Reorientation of the paleography during the Laramide orogeny (contemporaneous with fluvial deposition) probably changed the orientation of the meander belt trends. DOE

N83-27531*# California Univ., Livermore. Lawrence Livermore Lab.
THE DMSP/MFR TOTAL OZONE AND RADIANCE DATA BASE
J. S. Ellis, J. E. Lovill, F. M. Luther, T. J. Sullivan, S. S. Taylor, and R. L. Weichel Jan. 1983 44 p refs Sponsored in part by NASA and FAA
(Contract W-7405-eng-48)
(NASA-CR-170370; NAS 1.26:17037; DE83-007308; UCID-19690) Avail: NTIS HC A03/MF A01

This report describes the entries in sufficient detail so that the data base might be useful to others. The characteristics of the MFR sensor are briefly discussed and a complete index to the data base tapes is given. DOE

N83-27532# Lulea Univ. (Sweden). Div. of Water Resources Engineering.
MODELING THE TURBULENCE STRUCTURE OF THE ADIABATIC ATMOSPHERIC BOUNDARY LAYER
Urban Svensson 1982 21 p refs
(Contract SWEDCBR-C-790159-2)
(TULEA-1982-12; Ser-A-87; ISSN-0347-0881) Avail: NTIS HC A02/MF A01

The validity of an atmospheric model is checked. The model assumes that the boundary layer is adiabatic and neglects all horizontal gradients, except for pressure. Terms for generation, dissipation, pressure-strain, wall correction, diffusion and rotation are included in the partial differential equation model. A one dimensional transient computer program was used. A numerical grid consisting of 40 grid nodes was found to produce grid independent solutions. Predictions from the model and measurements coincide to lend support to the logarithmic wind profile in the surface. The predicted Reynold stresses, turbulent kinetic energy and its dissipation rate are presented. Author (ESA)

N83-27533# Consiglio Nazionale delle Ricerche, Florence (Italy). Ist. di Ricerca sulle Onde Elettromagnetiche.
USE OF THE VHF SIGNAL OF THE SIRIO SATELLITE FOR IONOSPHERIC INVESTIGATIONS
P. Spalla, E. Capannini, L. Ciraolo, and R. Ragionieri 1983 24 p refs Presented at COSPAR/URSI Symp. on Beacon Satellite Studies of the Earth's Environ., New Dehli, 7-11 Feb. 1983
Avail: NTIS HC A02/MF A01

Total electron content (TEC) determinations were obtained by measuring Faraday rotation with a circular component polarimeter. The method used to solve the pi ambiguity, relating the TEC to other independent ionospheric data given by a near ionosonde, and a method for determining the polarization at the satellite are presented. The TEC profiles of over 1200 days and their monthly median values were obtained. The TEC behavior during the 21st solar cycle is discussed. Author (ESA)

N83-27534# Agbabian Associates, El Segundo, Calif.
SEISMIC RESPONSE OF PORT AND HARBOR FACILITIES
S. D. Werner Oct. 1982 354 p refs
(Grant NSF CEE-80-12337)
(PB83-145490; AA-R-8122-5395; NSF/CEE-82057) Avail: NTIS HC A16/MF A01 CSCL 13B

This report evaluates the seismic response characteristics of port and harbor facilities in terms of: (1) the lessons to be learned from the observed behavior of such facilities during earthquakes; (2) the adequacy of their current seismic design provisions; and (3) the use of dynamic analysis to enhance these design provisions. It was found that: (1) the potential for damage port and harbor

facilities is most strongly related to powerwater pressure buildup in the surrounding soil materials; (2) the current seismic design provisions for such facilities often fail to consider many of the possible effects of earthquake resistent design of port and harbor facilities; and (3) deterministic total stress methods of dynamic analysis are applicable to port and harbor facilities. Author (GRA)

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N83-27535 National Maritime Inst., Feltham (England).
REPORT ON THE WEST SOLE WIND STRUCTURE PROJECT 1982
J. A. B. Wills Apr. 1982 61 p refs Sponsored by Offshore Energy Technology Board and British Petroleum Development Ltd.
(NMI-R-145; OT-R-8240) Copyright. Avail: Issuing Activity

The installation of anemometers and related instruments for measuring wind velocity profiles and turbulence at the West Sole "A" platform in the southern North Sea is described. Data on the variation with height of the mean wind velocity, the turbulent velocities and the sizes of turbulent eddies, all related to design needs for ships and platforms are gathered. The equipment for automatically controlling the experiment and recording the data are also described. Operational experience to date and preliminary results are summarized. Author (ESA)

N83-27536*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE SENSITIVITY OF NUMERICALLY SIMULATED CLIMATES TO LAND-SURFACE BOUNDARY CONDITIONS
Yale Mintz (Maryland Univ., College Park) Aug. 1982 54 p refs Presented at the JSC Study Conf. on Land Surface Processes in Atmospheric Gen. Circulation Models, Greenbelt, Md., 5-10 Jan. 1981 Submitted for publication
(NASA-TM-83985; NAS 1.15:83985) Avail: NTIS HC A04/MF A01 CSCL 04B

Eleven sensitivity experiments that were made with general circulation models to see how land-surface boundary conditions can influence the rainfall, temperature, and motion fields of the atmosphere are discussed. In one group of experiments, different soil moistures or albedos are prescribed as time-invariant boundary conditions. In a second group, different soil moistures or different albedos are initially prescribed, and the soil moisture (but not the albedo) is allowed to change with time according to the governing equations for soil moisture. In a third group, the results of constant versus time-dependent soil moistures are compared. Author

N83-27537*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
RF RADIATION FROM LIGHTNING CORRELATED WITH AIRCRAFT MEASUREMENTS DURING STORM HAZARDS-82
D. M. LeVine Mar. 1983 27 p refs
(NASA-TM-85007; NAS 1.15:85007) Avail: NTIS HC A03/MF A01 CSCL 04B

During the Storm Hazards Experiment 1982, the Goddard Space Flight Center monitored radiation from lightning from a site at the Wallops Flight Facility, Wallops Island, VA. Measurements were made while the NASA F106 penetrated thunderstorms to obtain data on lightning strikes to the aircraft. The objective of the ground-based measurements was to help determine if the events recorded by the F106 were part of lightning discharges. During the experiment, 53 cases were obtained in which events were recorded aboard the aircraft while reliable quality RF radiation was recorded on the ground. These cases came from 12 different storms occurring from June through August 1982. The data confirms that the aircraft was measuring events which were part of lightning and indicates that the events recorded on the aircraft tend to occur early in the flash. Author

N83-27538*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
WATERSPOUT, GUST FRONTS AND ASSOCIATED CLOUD SYSTEMS
Joanne Simpson May 1983 54 p refs
(NASA-TM-85032; NAS 1.15:85032) Avail: NTIS HC A04/MF A01 CSCL 04B

Nine waterspouts observed on five experimental days during the GATE period of observations are discussed. Primary data used are from 2 aircraft flying in different patterns, one above the other between 30 and 300 m. There is strong evidence associating whirl initiation with cumulus outflow. Computations prepared from estimates of convergence with the region suggest the possibility of vortex generation within 4 minutes. This analysis supports (1) the importance cumulus outflows may have in waterspout initiation and (2) the possibility that sea surface temperature gradients may be important in enabling waterspout development from modest size cumuli. Author

N83-27539# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
CONTRASTS BETWEEN WET AND DRY PERIODS WITHIN THE 1981 RAINY SEASON IN NORTHEAST BRAZIL
Vernon E. Kousky, Iracema F. A. Cavalcanti, and Manoel A. Gan May 1983 6 p refs Proposed for presentation at the 1st Intern. Conf. on Southern Hemisphere Meteorol., Sao Jose dos Campos, Brazil, 31 Jul. - 6 Aug. 1983
(INPE-2728-PRE/310) Avail: NTIS HC A02/MF A01

The rainy season in northern Northeast Brazil, which normally occurs between February and May, was characterized by extremes. Very little rainfall was recorded until 15 March. During 15 to 30 March excessive rainfall occurred over nearly the entire region. April experienced a return to abnormally dry conditions. By compositing tropospheric wind field for the contrasting periods, the salient features associated with these extremes are determined. Streamline, divergence and vertical motion fields are produced for the composite fields and on a daily basis. Preliminary results indicate that the Southern Hemisphere midlatitude circulation pattern was the primary factor in initiating the convective activity. S.L.

N83-27540# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
LOW LATITUDE UPPER TROPOSPHERIC CYCLONIC VORTICES IN THE SOUTH ATLANTIC: THEIR ORIGIN, CHARACTERISTICS AND EFFECTS ON TROPICAL CONVECTION OVER EASTERN BRAZIL
Vernon E. Kousky and Manoel A. Gan May 1983 5 p refs Proposed for presentation at the 1st Intern. Conf. on Southern Hemisphere Meteorol., Sao Jose dos Campos, Brazil, 31 Jul. - 6 Aug. 1983
(INPE-2729-PRE/311) Avail: NTIS HC A02/MF A01

The occurrence of upper tropospheric cyclonic vortices in the low latitude region of South America and eastern Brazil is related to characteristics of the upstream flow. These vortices form primarily during the southern summer months when the upper tropospheric flow over South America is strongly anticyclonic. Individual systems form or intensify generally 12-24 hours after the amplification of an upstream ridge. Although the displacement of these vortices is generally erratic there is a tendency for the low latitude (10-15S) systems to move westward. These greatly affect the distribution and intensity of convection over eastern Brazil. Author

N83-27541# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
SYNOPTIC PRECURSORS OF THREE SEVERE BRAZILIAN FREEZES IN THE PACIFIC OCEAN AND SOUTH AMERICA
Michael A. Fortune and Vernon E. Kousky May 1983 4 p refs Proposed for presentation at the 1st Intern. Conf. on Southern Hemisphere Meteorol., Sao Jose dos Campos, Brazil, 31 Jul. - 6 Aug. 1983
(INPE-2730-PRE/312) Avail: NTIS HC A02/MF A01

The important precursors of three Brazilian freezes that affected world coffee markets were found to be: (1) a slowly moving long wave pattern in the central south Pacific Ocean amplified abnormally four to five days before the freezes; (2) the long wave ridge was located in the southern Andes, while the troughs were located near 120 deg W and 50 deg W in the Pacific and Atlantic Ocean respectively. Two factors contributed to unusual amplification of cold troughs in Brazil: the opportune superposition of short and long wave troughs, and propagation of wave energy from the mid-Pacific at group velocity. Author

N83-27542*# State Univ. of New York, Albany. Atmosphere Sciences Research Center.

AIRCRAFT MEASUREMENTS OF TRACE GASES AND PARTICLES NEAR THE TROPOPAUSE Final Report

P. Falconer, R. Pratt, A. Detwiler, C.-S. Chen, A. Hogan, S. Bernard, K. Krebschull, and W. Winters NASA Washington Jun. 1983 148 p refs

(Grant NsG-3138)

(NASA-CR-3691; NAS 1.26:3691) Avail: NTIS HC A07/MF A01 CSCL 04B

Research activities which were performed using atmospheric constituent data obtained by the NASA Global Atmospheric Sampling Program are described. The characteristics of the particle size spectrum in various meteorological settings from a special collection of GASP data are surveyed. The relationship between humidity and cloud particles is analyzed. Climatological and case studies of tropical ozone distributions measured on a large number of flights are reported. Particle counter calibrations are discussed as well as the comparison of GASP particle data in the upper troposphere with other measurements at lower altitudes over the Pacific Ocean. J.M.S.

N83-27543# Air Force Environmental Technical Applications Center, Scott AFB, Ill.

REVISED UNIFORM SUMMARY OF SURFACE WEATHER OBSERVATIONS (RUSSWO) Final Report

20 Sep. 1982 400 p

(AD-A122719; USAFETAC/DS-82/054) Avail: NTIS HC A17/MF A01 CSCL 04/2

Surface weather observations are summarized. Weather conditions; atmospheric phenomena; precipitation, snowfall and snow depth (daily amounts and extreme values); surface winds; ceiling versus visibility; sky cover; psychrometric summaries (daily maximum and minimum temperatures, extreme maximum and minimum temperatures, psychrometric summary of wet-bulb temperature depression versus dry-bulb temperature, means and standard deviations of dry-bulb, wet-bulb and dew point temperatures and relative humidity); and pressure summary (means, standard, deviations, and observation counts of station pressure and sea-level pressure) are included. Data are presented in tabular form, in most cases in percentage frequency of occurrence or cumulative percentage frequency of occurring tables. Author

N83-27544# Science Applications, Inc., Dayton, Ohio.

CROSS CORRELATION ANALYSIS TO DETERMINE THE ENVIRONMENTAL PARAMETERS CORRELATED WITH ELECTRO-OPTICAL SYSTEM PERFORMANCE Interim Report, Jul. - Dec. 1980

Joel S. Davis and Peter Soliz Wright-Patterson AFB, Ohio AFWAL Nov. 1982 99 p refs

(Contract F33615-78-C-1557; AF Proj. 431G)

(AD-A124886; SAI-0002-02-005; AFWAL-TR 81-1099) Avail: NTIS HC A05/MF A01 CSCL 17/8

Sensor effectiveness in operational environments often depends on several environmental parameters, not only individually but, because they are often at least partly correlated, on the peculiar real world combinations in which they occur. While the statistical occurrence of various parameter combinations can be derived from weather observation records, correlated parameter statistics are not generally available, and, in any case, have limited utility because they do not directly transform to system performance characteristics. In this study, figures of merit associated with Electro-Optical (EO) sensor performance were calculated for individual synoptic conditions reported over a three year period of record for locations of interest. Using the resulting data base, which included the calculated figures of merit, as well as the weather parameters upon which they were based, performance statistics were developed and cross correlations performed; several potentially useful parameter correlations were found. Author (GRA)

N83-27545# Naval Postgraduate School, Monterey, Calif. Dept. of Meteorology.

SOUTHERN HEMISPHERE APPLICATION OF THE NAVY NESTED TROPICAL CYCLONE MODEL

James E. Peak and Russell L. Elsberry Dec. 1982 48 p refs (WF59551)

(AD-A125011; NPS63-82-007) Avail: NTIS HC A03/MF A01 CSCL 04/2

The Navy Nested Tropical Cyclone model is evaluated for performance on Southhern Hemisphere storms in the Australian region. East of 135 E the model exhibits mean forecast errors of 246, 467 and 694 km at 24, 48 and 72 h, respectively. West of 135 E the mean forecast errors are 214, 511 and 745 km at 24, 48 and 72 h. The NTCM tends to have a poleward directional bias in the predicted tracks. This bias may be attributed to the lack of current data, which causes the analysis scheme to revert to climatological values. The NTCM also did not forecast storm tracks well near the Australia coast, especially in the western cases, presumably due to lack of consideration of land/sea effects. In a homogeneous sample comparison with TYAN78, the NTCM performed worse in terms of forecast error at early forecast times and better at late forecast times east of 135 E. West of 135 E, the model performance is generally poorer than the analog scheme at all forecast times. The regression post-processing technique of Peak and Elsberry (1981) when applied to the NTCM forecasts results in a reduction of the eastern region sample forecast errors by as much as 150 km at 72 h. The western region forecast improvement is even greater, such that the regression modified NTCM forecasts are superior to TYAN78 in both test regions. Author (GRA)

N83-27546# Naval Postgraduate School, Monterey, Calif.

NUMERICAL SIMULATION OF THE INFLUENCE OF SMALL SCALE MOUNTAIN RANGES ON A BAROCLINIC WAVE M.S. Thesis

Jeffrey Peter Walker Dec. 1982 160 p refs

(AD-A125301) Avail: NTIS HC A08/MF A01 CSCL 04/2

A 6-level hemispheric primitive equation model was numerically integrated to examine the influence of various mountain ranges on a baroclinic flow. The objective was to simulate the apparent topographically-induced cyclogenesis that occurs over south central Alaska and isolate the mechanisms involved. It was found that the model simulates some of the characteristics of cyclogenesis in the lee of the Rockies, Alps, and Greenland. The topography appeared to cause a more local development in the lee at the expense of development over the whole domain of integration. The presence of a gap in the mountains was responsible for generating an eddy in th flow that moved eastward. This eddy became the primary development in cases with horseshoe-shaped mountains that had a maximum elevation of 3000 m. The overall results suggest that a weak form of development in the lee of the Alaska Range is possible and that the resulting surface development would be weak but more clearly defined at the 850 mb level. Author (GRA)

N83-27547# Weather Squadron (31st), APO New York, N.Y. Detachment 25. Aerospace Sciences Div.

TERMINAL FORECAST REFERENCE NOTEBOOK FOR RHEIN MAIN AB, GERMANY Final Report

Edgar E. Vachino, ed. 15 Oct. 1982 98 p

(AD-A124984) Avail: NTIS HC A05/MF A01 CSCL 04/2

Rhein Main Air Base is located at latitude 50 degrees 02 minutes North and longitude 08 degrees 34 minutes East. The field elevation of Rhein Main Air Base is 365 feet. The base is located on a flat rise of terrain from the low ground of the Main

River and Rhein River valleys, about six nautical miles east of Wiesbaden. The relatively flat Main River and Rhein River valleys extend twenty to forty miles west-southwest and southwest from the base. Rhein Main Air Base, surrounded on all sides by woods, is located on the left bank of the Main River in the north central edge of these valleys. Seven miles to the northwest of the base the Main River Valley is bounded by the Taunus Mountains which form a barrier oriented southwest to northeast. These mountains rise to elevations over 3000 feet MSL. To the south and southeast of the base the terrain rises slowly to the Odenwald Mountains with elevations from 1500 feet MSL to 2000 feet MSL. GRA

N83-27548# BDM Corp., Monterey, Calif.
AN ANALYSIS OF THE WYNGAARD-LEMONE MODEL OF REFRACTIVE INDEX AND MICROMETEOROLOGICAL STRUCTURE FUNCTIONS AT THE TOP OF A TURBULENT MIXED LAYER Progress Report, 15 Apr. - 30 Sep. 1982
C. W. Fairall Oct. 1982 98 p refs
(Contract N00014-82-C-0251)
(AD-A123986; NPS63-82-006-CR) Avail: NTIS HC A05/MF A01 CSCL 04/2

This report is a theoretical and experimental analysis of a model used to calculate the refractive index structure function parameter, C sub n squared, at the interfacial region at the top of an entraining, turbulent mixed layer. C sub n squared is related to the micrometeorological structure functions for temperature, humidity, and T-Q covariance. The mixed layer interfacial region is important for EM propagation because C sub n squared is greatly increased by large T and Q fluctuations due to the entrainment of warm, dry air from the nonturbulent atmosphere above the mixed layer. The theoretical basis of this model is examined and four data sets from the NPS aircraft measurements program are used to test the model. GRA

N83-27549# Weather Squadron (7th), New York, N.Y. Detachment 3.
TERMINAL FORECAST REFERENCE NOTEBOOK FOR GRAFENWOEHR AAF, GERMANY Final Report
1 Oct. 1982 35 p
(AD-A125038) Avail: NTIS HC A03/MF A01 CSCL 04/2

Grafenwoehr Army Airfield, located in the gently rolling hills of the Oberpfalz region of northern Bavaria, lies approximately 22 nautical miles west of the Czechoslovakian border, 10 nautical miles west of Weiden, and 38 nautical miles northeast of Nuernberg. The topography surrounding the airfield consists of hills, shallow valleys, small lakes and streams, heavily wooded sections and cultivated farmland. Topography affects the local weather in several ways. The extreme eastern location of the airfield, with respect to the rest of Germany, causes continental airmasses to prevail more often than at those stations in the western portion of Germany. Fog formation is enhanced by an abundance of small streams, lakes and condensation nuclei (very fine dust particles). GRA

N83-27550# Weather Squadron (7th), New York, N.Y. Detachment 7.
TERMINAL FORECAST REFERENCE NOTEBOOK FOR HEIDELBERG AB, GERMANY Final Report
1 Oct. 1982 59 p
(AD-A125037) Avail: NTIS HC A04/MF A01 CSCL 04/2

Heidelberg AAF lies in the Rhine River Valley approximately two miles southwest of the city of Heidelberg, which lies astride the Neckar River as it flows into the Rhine Valley. The topographic features that dominate the local area are relatively complex. The valley elevations average 300 to 500 feet above sea level and is described as gently rolling. The predominant type of air mass effecting the Heidelberg area during all seasons is maritime polar which produces a typical maritime climate with mild winters and cool summers. GRA

N83-27551# Oak Ridge Associated Universities, Inc., Washington, D.C.
PROCEEDINGS OF THE CARBON DIOXIDE RESEARCH CONFERENCE: CARBON DIOXIDE, SCIENCE AND CONSENSUS
Feb. 1983 539 p refs Conf. held in Berkeley Springs, W. Va., 19-23 Sep. 1982
(Contract DE-AC05-76OR-00033)
(DE83-007182; CONF-820970) Avail: NTIS HC A23/MF A01

Three areas of CO2 related questions are discussed. The areas include: the global carbon cycle, climate effects, and vegetation effects. The sources and sinks of CO2 are investigated. Estimates of regional and global changes in temperature and precipitation are presented. It is suggested that increased atmospheric CO2 may be a potential benefit to vegetation and crops because it is an essential element required for plant growth. DOE

N83-27552# Sandia Labs., Albuquerque, N. Mex.
SIMULATED MONITOR DISPLAY FOR CCTV
Basil J. Steele 1982 16 p Presented at the Inst. of Nucl. Mater. Meeting, Washington, D.C., 19 Jul. 1982
(Contract DE-AC04-76DP-00789)
(DE82-017020; SAND-82-1369C; CONF-820713-10) Avail: NTIS HC A02/MF A01

Two computer programs were developed which generate a two dimensional graphic perspective of the video output produced by a closed circuit television (CCTV) camera. Both programs were primarily written to produce a graphic display simulating the field of view (FOV) of a perimeter assessment system as seen on a CCTV monitor. The original program was developed for use on a Tektronix 4054 desktop computer; however, the usefulness of this graphic display program led to the development of a similar program for a Hewlett-Packard 9845B desktop computer. After entry of various input parameters, such as, camera lens and orientation, the programs automatically calculate and graphically plot the locations of various items, e.g., fences, an assessment zone, running men, and intrusion detection sensors. Numerous special effects can be generated to simulate such things as roads, interior walls, or sides of buildings. DOE

N83-27553# Hawaii Univ., Honolulu. Dept. of Meteorology.
KAHUKU KITE WIND STUDY. 1: KAHUKU BEACH BOUNDARY LAYER
P. A. Daniels and N. E. Oshiro Sep. 1982 102 p refs 2 Vol.
(Contract DE-FG03-77ET-20184)
(DE83-006403; UHMET-82-01) Avail: NTIS HC A06/MF A01

The boundary layer and its mechanism were investigated in the coastal plain of Kahuku, Oahu, during August 1980 and February to April 1981. Hand held short term kite measurements were used to verify the data from the prototype automatic kites during the first survey. Forces that modify the daytime air flow in the lower layers are: surface friction, local scale thermal wind, a sea breeze and mechanical forcing. The nighttime boundary is established through heat conduction from the surface air to the ground. Mechanisms that modify the winds in and around the nighttime boundary layer include: confluence into the boundary layer, local scale thermal wind, land breeze drainage winds, and friction. In the second survey, the boundary layer was neither as high nor as well developed as in the first because the ground was saturated after the winter rains. The consequent latent heat exchange prevented extreme surface temperature fluctuation. It is found that the commonly used wind profile law exponent depends on speed in the lower 100 ft of the atmosphere above which the exponent is constant. The importance of surveying not only all major wind regimes but also under different surface conditions is emphasized. DOE

N83-27554# Hawaii Univ., Honolulu. Dept. of Meteorology.
KAHUKU KITE WIND STUDY. 2: KAHUKU FOOTHILLS
P. A. Daniels and N. E. Oshiro Sep. 1982 168 p refs 2 Vol.
(Contract DE-FG03-77ET-20184)
(DE83-006402; UHMET-82-02) Avail: NTIS HC A08/MF A01

In a test to compare the instruments, eight kites were flown in a close pattern. The kites were flown continuously for 36 hours after which the trade winds disappeared. The kite winds were compared with those measured at two high meteorological towers on the ridge. Kites were flown at 120 ft and 240 ft for two periods

during May to June 1981 close to the Kahuku Opana anemometer. Considerably lower winds during late night/early morning hours during the second period as compared with the first stemmed from a land breeze component opposing the prevailing trades. Four methods to estimate long term wind speeds were tested. One is based on long term statistics and hourly vertical gradients of speed observed during the survey; the other three use simultaneously collected hourly mean winds at the kite levels and at 42 ft. Those based on linear regression and on statistical parameters developed from the survey period are close to the gradient estimate. Kites were flown continuously for 6 days at 120 and 240 ft above a potential wind mill site. During an August and September 1981 survey of three potential wind turbine ridges, the kite heads worked reasonably well. A vortex created by morning solar heating is along exposed ridge slopes upwind of some of the sites. Only marginally useful winds are estimated for the eastern most ridge during trades. DOE

N83-27555# Sandia Labs., Albuquerque, N. Mex. Environmental Research Div.
METEOROLOGICAL TOWER DATA, GRAND JUNCTION TAILINGS SITE, COLORADO Semiannual Report, Jul. - Dec. 1981
Hugh W. Church and Gerald T. Gay Jun. 1982 16 p ref
(Contract DE-AC04-76DP-00789)
(DE82-018919; SAND-82-0722) Avail: NTIS HC A02/MF A01

A 10 m tower was erected at the Grand Junction abandoned uranium mill tailings pile for the purpose of collecting on-site, detailed meteorological measurements. This report describes the site, equipment, data processing, and lists the data for the first six months of operation. DOE

N83-27556# Research Inst. of National Defence, Linkoeping (Sweden). Dept. 3.
INTERFACE UNIT FOR RELATIVE HUMIDITY MEASUREMENT WITH DEW POINT METER
Rolf Persson Jan. 1983 28 p refs In SWEDISH; ENGLISH summary
(FOA-C-30309-E) Avail: NTIS HC A03/MF A01

An interface unit is described for optimizing performance and accuracy for the EG-G-220 Dew Point and Temperature Monitoring System, and for computing and displaying relative humidity values from obtained data. The measurement is based on the detection, with the aid of a Peltier element and a monitoring system, of the mist condensed from the air on a cooled gilded mirror. An algorithm which approximates a nonlinear relationship is adapted to a floating point package, and is used in a microcomputer program. Author (ESA)

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N83-27557# Coastal Engineering Research Center, Fort Belvoir, Va.
EVALUATION OF PHYSICAL AND NUMERICAL HYDRAULIC MODELS, MASONBORO INLET, NORTH CAROLINA Final Report
James E. McTamany Feb. 1982 53 p refs
(AD-A116110; GITI-22) Avail: NTIS HC A04/MF A01 CSCL 08/10

A fixed bed distorted scale physical model, a two dimensional vertically integrated numerical model, and a spatially, integrated numerical model were calibrated to determine prototype conditions. Author

N83-27558# Army Cold Regions Research and Engineering Lab., Hanover, N. H. Applied Research Branch.
THE BRINE ZONE IN THE MCMURDO ICE SHELF, ANTARCTICA
Austin Kovacs, Anthony J. Gow, James H. Cragin, and Rexford M. Morey Dec. 1982 35 p refs
(Grants NSF DPP-74-23654; NSF DPP-80-04221)
(AD-A124516; CRREL-82-39) Avail: NTIS HC A03/MF A01 CSCL 08/10

Observations of a 4.4 m high brine step in the McMurdo Ice Shelf, Antarctica, show that it has migrated about 1.2 km in 4 years. The present brine wave is overriding an older brine-soaked layer. This migration is proof of the dynamic nature of the step, which is the leading edge of a brine wave that originated at the shelf edge after a major break-out of the McMurdo Ice Shelf. The inland boundary of brine penetration is characterized by a series of descending steps that are believed to represent terminal positions of separate intrusions of brine of similar origin. The inland boundary of brine percolation is probably controlled largely by the depth at which brine encounters the firn/ice transition (43 m). However, this boundary is not fixed by permeability considerations alone, since measurable movement of brine is still occurring at the inland boundary. Freeze-fractionation of the seawater as it migrates through the ice shelf preferentially precipitates virtually all sodium sulfate, and concomitant removal of water by freezing in the pore spaces of the infiltrated firm produces residual brines approximately six times more concentrated than the original seawater. GRA

N83-27559# Woods Hole Oceanographic Institution, Mass. Dept. of Physical Oceanography.
LONG TERM UPPER OCEAN STUDY (LOTUS): A SUMMARY OF THE HISTORICAL DATA AND ENGINEERING TEST DATA
Richard P. Trask, Melbourne G. Briscoe, and Nancy J. Pennington Dec. 1982 109 p refs
(Contract N00014-76-C-0197; NR Proj. 083-400)
(AD-A124362; WHOI-82-53) Avail: NTIS HC A06/MF A01 CSCL 08/3

The Long Term Upper Ocean Study (LOTUS) is an experiment designed to acquire and analyze a continuous two year set of measurements of the fluctuation of currents and temperature in the upper ocean, together with the local hydrography and meteorology. Data acquisition formally began in May 1982 with the deployment of a moored array of current meters, thermistor chains and meteorological sensors. The plans for LOTUS evolved over a number of years. As the experiment began to take form, a two year period (1980, 1981) was devoted to engineering tests to ascertain whether the goals established during early planning stages could indeed be accomplished. This report will summarize the planning and testing that were associated with LOTUS up to the first science deployment in May 1982. It will begin by presenting a brief summary of the details and questions raised by previous experiments which led to the present design of the LOTUS experiment. The site chosen for the experiment will be presented followed by a description of the cruises made during the engineering test period. Data collected prior to and during the planning and testing periods will be presented in later sections according to the type of data (i.e., current meter, XBT, CTD). GRA

N83-27560# Washington Univ., Seattle. Dept. of Atmospheric Sciences.
SUMMER DECAY AND RETREAT OF A SEA ICE COVER Annual Report, 1 Oct. 1981 - 30 Sep. 1982
Gary A. Maykut 1 Dec. 1982 33 p refs
(Contract N00014-76-C-0234; NR Proj. 307-252)
(AD-A125124; AR-14) Avail: NTIS HC A03/MF A01 CSCL 08/12

The project is focused on problems related to the summer decay and retreat of a sea ice cover. Research topics include: (1) interaction of shortwave radiation with the ice and upper ocean, (2) lateral melting and erosion in leads, (3) floe size distribution, (4) optical properties of ice and snow, and (5) ice growth in large leads and polynyhas. Field work was carried out near Prince Patrick Island in the Canadian Arctic and over the ice pack in the Bering Sea. GRA

N83-27561# Coastal Engineering Research Center, Fort Belvoir, Va. Coastal Oceanography Branch.
PREDICTION OF NEARSHORE WAVE TRANSFORMATION

Jon M. Hubertz Dec. 1982 14 p refs
(AD-A125104; CERC-CETA-82-7) Avail: NTIS HC A02/MF A01 CSCL 08/3

The DHI System 21 Mark 8 numerical model for the prediction of both long and short waves is being used in certain studies of coastal engineering problems. Procedures are discussed for using the model to predict nearshore short wave transformations. An example is presented showing the combined effects of refraction, shoaling, reflection, and diffraction. Predicted model results are compared to measured wave heights at the Coastal Engineering Research Center's Field Research Facility in Duck, North Carolina. Author (GRA)

N83-27562# Woods Hole Oceanographic Institution, Mass.
A COMPILATION OF MOORED INSTRUMENT DATA AND ASSOCIATED OCEANOGRAPHIC OBSERVATIONS. VOLUME 30: GULF STREAM EXTENSION AND NORWEGIAN SEA OVERLOW INTRUSION EXPERIMENTS, 1979 - 1980
Ellen Levy, Susan A. Tarbell, and N.P. Fofonoff Oct. 1982 74 p refs
(Contract N00014-76-C-0197; NR Proj. 083-400)
(AD-A124818; WHOI-82-43) Avail: NTIS HC A04/MF A01 CSCL 08/10

Current and temperature measurements are presented from instruments deployed during October and November of 1979, southeast of the Grand Banks in North Atlantic, between 37 N and 41 N and between 42 W and 47 W. The measurements were made as part of two concurrent experiments, the Gulf Stream Extension (GSE) and the Norwegian Sea Overflow Intrusion (NSOI) arrays. Data from the current meters are presented in statistical tables and graphically as scatter plots, histograms, progressive vector plots, spectral plots and time series plots. Filtered time series are shown in composite displays. Data from XBT, CTD and T/Ps are also presented graphically. GRA

N83-27563# Naval Research Lab., Washington, D. C. Space Sensing Applications Branch.
BATHYMETRIC DATA AND ANALYSIS FOR THE NRL REMOTE SENSING EXPERIMENT: PHELPS BANK, JULY 1982
F. Gorman and J. A. C. Kaiser 7 Mar. 1983 41 p refs
(AD-A125220: NRL-MR-5031) Avail: NTIS HC A03/MF A01 CSCL 08/10

The NRL (Naval Research Laboratory) Remote Sensing Experiment was carried out in and around Phelps Bank (about 40 miles south - southeast of Nantucket Island) during July, 1982. The exercise was the pilot experiment in a program to examine how and why ocean surface expressions of bathymetric features are sometimes manifest. The specific expressions of interest occur in several types of radar images of the ocean surface. The most interest is in SAR (synthetic aperture radar) images since they appear to be most sensitive to the surface bathymetric signatures; and historically these signatures were first observed in SAR imagery. The exercise involved a surface ship (USNS HAYES) and several aircraft. The HAYES collected meteorological, Oceanographic and Bathymetric data in the operational area. Since this exercise was concerned with bathymetric effects, the precision depth recorder (PDR) system on the HAYES was continually run while in the area bounded by 40 deg and 41 deg N, and 69 deg and 70 deg W. The maximum concentration of data was in the area 40 deg 40 min N to 41 deg N and 69 deg 40 min W. This report describes the data, the instrumentation, its method of collection, and finally presents the data in graphical and tabular form. The data here covers a relatively large area. The same PDR data was more densely scanned in the immediate vicinity of Phelps Bank and plotted in Gordon and Greenewalt (1982). GRA

N83-27564# Naval Postgraduate School, Monterey, Calif.
SATELLITE APPLICATIONS TO ACOUSTIC PREDICTION SYSTEMS M.S. Thesis
Stephen A. Cox Oct. 1982 151 p refs
(AD-A125027; NPS68-82-005) Avail: NTIS HC A08/MF A01 CSCL 08/10

Predicting the thermal structure of the oceans is of importance to the Naval tactician, logistician, or search and rescue coordinator. Understanding the structure of the oceans provides valuable insights to those who must utilize the oceanic environment effectively in their day to day operations. Today, recent information about an area is limited to point observations of single bathythermographs. Few models produce an accurate picture of the ocean environment that can be used for updating tactics to conform to a changing situation. Producing a reliable prediction of conditions for a large area, while using limited resources, is the basic objective of this paper. Satellite infrared imaging of the ocean surface has been used effectively to map sea surface temperature patterns. Such sea surface temperature patterns can be used, along with climatology, to identify subsurface thermal structure in an ocean area according to results of this study. More accurate inputs can be made to range dependent acoustic prediction models, thus improving the antisubmarine warfare environmental predictions available to fleet users. Author (GRA)

N83-27565# Pacific Missile Test Center, Point Mugu, Calif. Geophysics Div.
TIDAL AND LUNAR DATA FOR POINT MUGU, SAN NICOLAS ISLAND, AND THE BARKING SANDS AREA DURING 1983
Richard W. Dixon 30 Dec. 1982 67 p
(AD-A124810; PMTC-TP-000006) Avail: NTIS HC A04/MF A01 CSCL 08/3

Basic lunar and tidal data for Point Mugu, San Nicolas Island, and the Barking Sands area during 1983 are provided. The data presented are (1) tidal data, (2) times of moonrise and moonset, and (3) times of lunar phases. GRA

N83-27566# Danish Meteorological Inst., Copenhagen.
THE ICE CONDITIONS IN THE GREENLAND WATERS, 1975
May 1982 155 p In ENGLISH and DANISH
(ISBN-87-7478-185-5) Avail: NTIS HC A08/MF A01

Monthly ice charts for the entire Greenland region and local reconnaissance charts are presented. Author (ESA)

N83-27567# General Oceanics, Inc., Miami, Fla.
BLAKE PLATEAU: MID-DEPTH AND BOTTOM CURRENT MEASUREMENTS Final Report
C. Casagrande Sep. 1982 178 p refs
(Contract DI-AA851-CT0-35)
(PB83-144519; BLM/YL/ES-82/06) Avail: NTIS HC A09/MF A01 CSCL 08C

Five moorings instrumented with current meters were anchored along latitude 30 degrees N (75-970 m depth) from August 27, 1980 to October 6, 1981. Meters moored at 200 m and 400 m above the bottom indicate the Gulf Stream as a strong northward flow whose meanders created speed and temperature fluctuations representing 40-70% of the total variance recorded; many at 2-14 day intervals. Near bottom flows on moorings east of the Gulf Stream displayed prolonged southward flow events lasting up to 42 days and reaching speeds in excess of 30 cm/sec. GRA

N83-27568# Edgerton, Germeshausen and Grier, Inc., Waltham, Mass.
INTERPRETATION OF THE PHYSICAL OCEANOGRAPHY OF GEORGES BANK, VOLUME 1 Final Report
Charles N. Flagg, Bruce A. Magnell, Daniel Frye, Jerome J. Cura, Scott E. McDowell, and Richard I. Scarlet Jul. 1982 651 p refs
(Contract DI-AA851-CT1-39)
(PB83-149054; EG/G-82-B4569-VOL-1; BLM/YL/ES-82/07) Avail: NTIS HC A99/MF A01 CSCL 08J

This analysis includes hydrographic fields (temperatures, salinities, densities, and nutrients), currents measured by moored current meters and drogues, productivity and plankton assemblages, and meteorological forcing fields. The report presents and describes the determination of average values and seasonal cycles of these properties. Interpretations of mixing and exchange rates, residence times, nutrient sources, and water mass formation are presented. Features studied in particular detail include the Georges Bank gyre circulation, the cold band, the influence

of Gulf Stream eddies on the shelf/slope front, and factors associated with enhanced biological productivity. GRA

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N83-27569* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
RAPID, QUANTITATIVE DETERMINATION OF BACTERIA IN WATER Patent
Emmett W. Chappelle, Grace L. Picciolo (Hahnemann Hospital, Philadelphia, Pa.), Richard R. Thomas (Boeing Co., Houston, Tex.), Eldon L. Jeffers (Boeing Co., Houston, Tex.), and Jody W. Deming, inventors (to NASA) (Hahnemann Hospital, Philadelphia, Pa.) Issued 20 Mar. 1978 18 p Filed 20 Mar. 1978 Supersedes N78-22585 (16 - 13, p 1734)
(NASA-Case-GSC-12158-1; US-Patent-4,385,113; US-Patent-Appl-SN-888434; US-Patent-Class-435-8; US-Patent-Class-422-52; US-Patent-Class-435-3; US-Patent-Class-435-34; US-Patent-Class-435-38; US-Patent-Class-435-39; US-Patent-Class-435-289; US-Patent-Class-435-291) Avail: US Patent and Trademark Office CSCL 06C

A bioluminescent assay for ATP in water borne bacteria is made by adding nitric acid to a water sample with concentrated bacteria to rupture the bacterial cells. The sample is diluted with sterile, deionized water, then mixed with a luciferase-luciferin mixture and the resulting light output of the bioluminescent reaction is measured and correlated with bacteria present. A standard and a blank also are presented so that the light output can be correlated to bacteria in the sample and system noise can be substracted from the readings. A chemiluminescent assay for iron porphyrins in water borne bacteria is made by adding luminol reagent to a water sample with concentrated bacteria and measuring the resulting light output of the chemiluminescent reaction.
Official Gazette of the U.S. Patent and Trademark Office

N83-27570# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A FINITE ELEMENT ANALYSIS OF THE CREEP RESPONSE OF LUMBAR INTERVERTEBRAL JOINTS IN THE RHESUS MONKEY M.S. Thesis
William John Rothwell, Jr. Dec. 1982 185 p refs
(AD-A124740; AFIT/GAE/AA/82D-24) Avail: NTIS HC A09/MF A01 CSCL 06/19

Lumbar intervertebral centra from healthy, adolescent Rhesus Monkeys (Macaca Mulatta) were subjected to axial compression loads of 15 and 30 pounds for a period of eight hours and displacement-time data was gathered. An axisymmetric finite element model was used to analytically determine material parameters describing the observed creep for each applied load. Analytical stress profiles in two horizontal planes through the vertebral centrum indicated a predominance of stress in cortical bone and the transition of stress from the Trabecular bone to the Cortical bone as creep proceeded. According to the model, the Centrum behaved as though the Cortex was acting like a thin shell constraining the outward flow of a viscoelastic Trabecular bone region. Viscoelastic constants determined for the Trabecular bone region were incorporated into an overall model of the intervertebral joint minus the Articular Facet Joint and associated spinous processes. GRA

N83-27571# California Univ., Berkeley. Lawrence Berkeley Lab.
BIOMEDICAL APPLICATIONS OF DIGITAL AUTORADIOGRAPHY WITH A MWPC
R. Bellazzini, G. Betti, A. DelGuerra, M. M. Massai, M. Ragadini, G. Spandre, G. Tonelli, R. Venturi, and F. Zito May 1982 11 p Presented at the World Congr. on Med. Phys. and Biomed. Eng., Hamburg, 6 Sep. 1982
(Contracts W-7405-eng-48; DE-AC03-76SF-00098) (DE82-017055; LBL-13772; CONF-820921-2) Avail: NTIS HC A02/MF A01

A Multiwire Proportional Chamber (MVPC) was used as a beta (-) radioactivity detector in biological and medical applications. Two different kinds of experiments were performed: the study of variations in the ability of cell clones to incorporate a radioactive precursor of DNA biosynthesis and the regional carbohydrate consumption in myocardial tissue by means of a deposit tracer of glucose metabolism. DOE

N83-27572# Joint Publications Research Service, Arlington, Va.
USSR REPORT: LIFE SCIENCES. EFFECTS OF NONIONIZING ELECTROMAGNETIC RADIATION, NO. 9
3 Jun. 1983 44 p refs Transl. into ENGLISH from various Russian articles
(JPRS-83601) Avail: NTIS HC A03

Effects of nonionizing electromagnetic radiation on organisms and biological tissues are reported. Topics discussed are: effects of decimeter waves; microwave effects; mathematical modeling methods; alternating magnetic fields and magnetic field effects; electrostate field effects; magnetic field therapy; decimeter wave treatment; biological effects of ultraviolet radiation; high frequency and ultrahigh frequency electric fields. For individual titles, see N83-27573 through N83-27576.

N83-27573# Joint Publications Research Service, Arlington, Va.
EFFECT OF DECIMETER WAVES ON FUNCTIONAL STATE OF CARDIOVASCULAR SYSTEM, SOME BIOCHEMICAL AND IMMUNOLOGICAL PARAMETERS OF PATIENTS RECOVERING FROM MYOCARDIAL INFARCTION c52
Ye. I. Sorokina, N. B. Poshkus, Yu. Yu. Tupitsina, L. P. Volkova, A. V. Shubina, and V. Ye. Krasnikov *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 9 (JPRS-83601) 3 Jun. 1983 p 1-5 refs Transl. into ENGLISH from Vopr. Kurortol. Fizioter, Lech. Fiz. Kult. (Moscow), no. 2, Mar.-Apr. 1982 p 9-13 (For primary document see N83-27572 16-51)
Avail: NTIS HC A03

Optimum localization of decimeter wave (DMW) treatment and its intensity was determined to investigate the effect of DMW on functional state of the cardiovascular system, and clinical biochemical parameters of patients with myocardial infarction in the early posthospitalization period. It is assumed that the effect of DMW via the segmented autonomic system leads to marked changes in the systems. With delivery of treatment to the DI-DV region, the effect on the heart occurs first through the autonomic nervous system which is shown by its vagotropic effect. E.A.K.

N83-27574# Joint Publications Research Service, Arlington, Va.
MORPHOLOGICAL EFFECTS OF CHRONIC ACTION OF SHF FIELD ON NERVOUS SYSTEM OF MICE c52
V. V. Antipov, V. I. Drobyshev, V. S. Tikhonchuk, V. P. Fedorov, and L. V. Pakhunova *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 9 (JPRS-83601) 3 Jun. 1983 p 14-20 refs Transl. into ENGLISH from Med. Radiol. (Moscow), no. 7, Jul. 1982 p 58-62 (For primary document see N83-27572 16-51)
Avail: NTIS HC A03

Changes in the nervous system after exposure to electromagnetic radiation in the microwave range were investigated. Significant morphological changes upon exposure to intensive microwave effects are noted. The biological effects of low intensity SHF electromagnetic radiation were minor changes in the system. The possible changes in the organism when exposed to thermal levels are studied with regard to the increasing interest of clinicians in the use of SHF electromagnetic radiation for therapeutic purposes. Questions of the specific nature of the changes and effects of cumulation of damage are studied. The morphological reaction of the central nervous system is compared to the peripheral nervous system. E.A.K.

N83-27575# Joint Publications Research Service, Arlington, Va.
INVESTIGATION OF ADAPTIVE PROCESSES IN PERIPHERAL BLOOD USING MATHEMATICAL MODELING METHODS c52

M. Yu. Antomonov and N. M. Gonchar *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 9 (JPRS-83601) 3 Jun. 1983 p 21-28 refs Transl. into ENGLISH from Radiobiol. (Moscow), v. 22, no. 6, Nov-Dec. 1981 p 805-809 (For primary document see N83-27572 16-51)
Avail: NTIS HC A03

The results of a cytochemical investigation of peripheral blood neutrophils upon exposure to microwaves of 2,375 MHz frequency with an energy flux density of 500 micro V/sq cm were analyzed of the presence of two components in the response of the system: a cumulative and a adaptive component were established. A cumulation curve was constructed and the form of the adaptive component determined from experimental data. It is shown that changes in the cytochemical parameters of cells can be used to evaluate the biological action of microwaves of low intensity in the radio frequency band. E.A.K.

N83-27576# Joint Publications Research Service, Arlington, Va.
FUNCTION OF ADRENO-PITUITARY SYSTEM IN VARIOUS REGIMES OF EFFECT OF ALTERNATING MAGNETIC FIELD OF INDUSTRIAL FREQUENCY c52
N. A. Udintsev and V. V. Moroz *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 9 (JPRS-83601) 3 Jun. 1983 p 29-35 refs Transl. into ENGLISH from Gig. Tr. Prof. Zabol. (Moscow), no. 12, Dec. 1982 p 54-56 (For primary document see N83-27572 16-51)
Avail: NTIS HC A03

Magnetic fields which are widely utilized in industry and in the national economy and their effects were examined. Under production conditions workers are subjected to the effect of highly significant constant and alternating magnetic fields producing functional shifts in the neuroendocrine, cardiovascular and other systems. The standards for the maximum permissible level of effect of magnetic fields during work with magnetic devices and materials were established. The nature of the reaction to the effect of an alternating magnetic field depending on the duration and frequency of the field's effect were evaluated. The dynamics of the function of the basic links of the adrenopituitary system, which plays an important role in the mechanism of adaptation and is sensitive to the effect of a magnetic field were studied. Alternating magnetic fields of an induction of 20 mT of an industrial frequency possessing a significant biological activity for man are examined. E.A.K.

52 AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and weightlessness.

N83-27577* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
BIO-MEDICAL FLOW SENSOR Patent
H. Eugene Winkler, inventor (to NASA) Issued 16 Apr. 1981 6 p Filed 16 Apr. 1981 Supersedes N81-24717 (19 - 15, p 2101)
(NASA-Case-MSC-18761-1; US-Patent-4,384,578;
US-Patent-Appl-SN-254688; US-Patent-Class-604-114;
US-Patent-Class-73-204; US-Patent-Class-128-DIG.13;
US-Patent-Class-604-151) Avail: US Patent and Trademark Office CSCL 06B

A bio-medical flow sensor including a packageable unit of a bottle, tubing and hypodermic needle which can be pre-sterilized and is disposable. The tubing has spaced apart tubular metal segments. The temperature of the metal segments and fluid flow therein is sensed by thermistors and at a downstream location heat is input by a resistor to the metal segment by a control electronics. The fluids flow and the electrical power required for the resisto to maintain a constant temperature differential between the tubular metal segments is a measurable function of fluid flow through the tubing. The differential temperature measurement is made in a control electronics and also can be used to control a flow control valve or pump on the tubing to maintain a constant flow in the tubing and to shut off the tubing when air is present in the tubing. Official Gazette of the U.S. Patent and Trademark Office

N83-27578* National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
APPARATUS FOR DETERMINING CHANGES IN LIMB VOLUME Patent
Pramode K. Bhagat (Kentucky Univ., Lexington) and Vic C. Wu, inventors (to NASA) (Kentucky Univ., Lexington) Issued 10 Feb. 1981 7 p Filed 10 Feb. 1981 Supersedes N81-24716 (19 - 15, p 2101) Sponsored by NASA
(NASA-Case-MSC-18759-1; US-Patent-4,383,533;
US-Patent-Appl-SN-233270; US-Patent-Class-128-660;
US-Patent-Class-128-663; US-Patent-Class-73-597) Avail: US Patent and Trademark Office CSCL 06P

Measuring apparatus for determining changes in the volume of limbs or other boty extremities by determining the cross-sectional area of such limbs many comprise a transmitter including first and second transducers for positioning on the surface of the limb at a predetermined distance there between, and a receiver including a receiver crystal for positioning on the surface of the limb. The distance between the receiver crystal and the first and second transducers are represented by respective first and second chords of the cross-section of the limb and the predetermined distance between the first and second transducers is represented by a third chord of the limb cross section.
Official Gazette of the U.S. Patent and Trademark Office

N83-27579* National Aeronautics and Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY: A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 246)
Jun. 1983 70 p refs
(NASA-SP-7011(246); NAS 1.21:7011(246)) Avail: NTIS HC $7.00 CSCL 06E

This bibliography lists 219 reports, articles and other documents introduced into the NASA scientific and technical information system in May 1983. Author

N83-27580# Army Research Inst. of Environmental Medicine, Natick, Mass.
EFFECTS OF SLEEP DEPRIVATION ON THERMOREGULATION DURING EXERCISE
Michael N. Sawka, Richard R. Gonzalez, and Kent B. Pandolf 1982 24 p refs Sponsored in part by the American College of Sports Medicine
(Grant NIH-OH-00836)
(AD-A124982; USARIEM-M-6/83) Avail: NTIS HC A02/MF A01 CSCL 06/19

Five fit males completed a practice, control (C) and sleep deprivation (SD) exercise test. Two nights of normal sleep preceded the C test and 33 h of wakefulness preceded the SD test. These tests consisted of 20 min of rest followed by 40 min of cycle ergometer exercise (50% of peak VO2) in a temperate (T sub a = 28 C, rh=30%) environment. Esophageal temperature (T sub es), local sweating rate (ds) and chest skin conductance (K sub ch) were continuously measured. In comparison to control levels, sleep deprivation resulted in a 26% increase in Tes from rest to final exercise values. Total body sweat rate, calculated from Potter balance measurements, was 27% less ($P<0.01$) for the SD test than the C test. Both d sub s and K such ch values were lower ($P<0.05$) during the final 20 min of exercise for the SD than C test. An asynchronous rather than a normal synchronous ds pattern was frequently observed during the SD test. The ds threshold was not changed but the ds sensitivity was 38% lower ($P<0.01$) during the SD than C test. During the SD test, the K sub ch threshold was 0.11 C lower ($P<0.05$) and K sub ch sensitivity (delta K such ch/delta Tes) was 42% lower ($P<0.05$) than during the C test. These data indicate that sleep deprivation decreases the potential for evaporative and dry heat loss during moderate intensity exercise. We believe that the reduced and dry heat loss during moderate intensity exercise. We believe that the reduced d

sub s and K sub ch responses were mediated by the central nervous system. GRA

N83-27581# Army Research Inst. of Environmental Medicine, Natick, Mass.
SLEEP DEPRIVATION DEPRESSES THERMOREGULATORY RESPONSES TO PHYSICAL EXERCISE
Michael N. Sawka and Richard R. Gonzalez (Yale Univ. School of Medicine) 13 Dec. 1982 12 p refs
(DA Proj. 3E1-62777-A-878)
(AD-A125062; USARIEM-M-3/83) Avail: NTIS HC A02/MF A01 CSCL 06/19

Thermoregulatory responses were examined in five male subjects during cycle ergometer exercise (50% of maximal aerobic power) in a temperature (Ta=28 C, rh=30%) environment. These exercise tests were conducted following normal sleep (control) and after 33 h of wakefulness. In comparison to control levels, sleep deprivation resulted in a greater increase (26%) in esophageal temperature from rest to final exercise values; sleep deprivation also resulted in reduced total body (27%) and local (19%) sweating rates as well as lowered sweating rate sensitivity (38%). An asynchronous rather than synchronous sweating rate pattern was frequently observed during the sleep deprivation test. Following sleep deprivation the threshold (0.11 C) and sensitivity (42%) for chest heat conductance were decreased. We conclude that sleep deprivation depressed thermoregulatory responses to physical exercise and that these responses may be mediated by the central nervous system. Author (GRA)

N83-27582# Queen Elizabeth Coll., London (England). Dept. of Physics.
A REVIEW OF THE CURRENT STATE OF EUROPEAN RESEARCH AND KNOWLEDGE CONCERNING THE BIOLOGICAL EFFECTS OF RADIOWAVES AND MICROWAVES Final Scientific Report, Jan. 1981 - Sep. 1982
R. J. Sheppard, E. H. Grant, and Frank Harlen (National Radiological Protection Board) 15 Sep. 1982 107 p refs
(Grant AF-AFOSR-0065-81; AF Proj. 2301; AF Proj. 2312)
(AD-A125205; EOARD-TR-83-3) Avail: NTIS HC A06/MF A01 CSCL 06/18

This report details work being carried out in various European laboratories concerning the possible biological effects of radiowaves and microwaves. It also details the safety limits for exposure to RF and microwaves in various European countries. Author (GRA)

N83-27583# Kentucky Univ., Lexington. Research Lab.
RESPONSE OF THE CARDIOVASCULAR SYSTEM TO VIBRATION AND COMBINED STRESSES Final Report, 1 Oct. 1979 - 30 Sep. 1982
Charles F. Knapp, Joyce M. Evans, and David C. Randall 30 Nov. 1982 81 p refs
(Grant AF-AFOSR-0039-80; AF Proj. 2312)
(AD-A125225; AFOSR-83-0003TR) Avail: NTIS HC A05/MF A01 CSCL 06/19

During the three year grant period, efforts were focused on the relative contribution of cardiac (in addition to peripheral vascular) mechanisms to the frequency response characteristics of integrated cardiovascular regulation during time-dependent acceleration stress. To this end, our chronically instrumented animal preparation was enhanced to include cardiac denervation. In these animals, ultrasonic dimension crystals were also added for measuring left ventricular major and minor axis, wall thickness and calculated volume. This is in addition to instrumentation for measuring aortic flow, left and right ventricular and aortic arch pressures, cardiac output, peripheral resistance, stroke volume, max dp/dt and heart rate. The animal preparation was further refined to include A/V nodal ablation to permit manipulation of heart rate (30 to 300 b/min) via a microprocessor controlled, opened or closed loop system. Closed loop control can be achieved between heart rate and a measured variable or combinations of variables such as arterial pressure, acceleration, etc. A separate study was also conducted to investigate the differences between cardiovascular responses to + and Gy acceleration vectors as well as combinations of Gy and Gz loadings. This study was initiated because of a lack of information concerning cardiovascular responses to Gy loadings and various G blends anticipated from the ACM's of AFTI type aircraft. A summary of major results is presented. GRA

N83-27584# Army Research Inst. of Environmental Medicine, Natick, Mass.
RECOVERY FROM SHORT TERM INTENSE EXERCISE: ITS RELATION TO CAPILLARY SUPPLY AND LACTATE RELEASE
Per A. Tesch (Karolinska Hospital) and James E. Wright 1982 26 p refs
(AD-A124965) Avail: NTIS HC A03/MF A01 CSCL 06/19

Muscle force recovery from short term intense exercise was examined in 16 physically active men. They performed 50 consecutive maximal voluntary knee extensions. Following a 40 s rest period 5 additional maximal contractions were executed. The decrease in torque during the 50 contractions and the peak torque during the 5 contractions relative to initial torque were used as indicies for fatigue and recovery, respectively. Venous blood samples were collected repeatedly up to 8 min past exercise for subsequent lactate analyses. Muscle biopsies were obtained from m. vastus lateralis and analysed for fiber type composition, fiber are and capillary density. Peak torque decreased 67 (range 47-82)% as a result of the repeated contractions. Lactate concentration after the 50 contractions was 2.9 + or - 1.3 m/mol and the peak post exercise value averaged 8.7 + or - 2.1 m/mol. Based on the present findings it is suggested that lactate elimination from the exercising muscle is dependent upon the capillary supply and influences the rate of muscle force recovery. GRA

N83-27585# Army Research Inst. of Environmental Medicine, Natick, Mass. Exercise Physiology Div.
ANGULAR SPECIFICITY AND TEST MODE SPECIFICITY OF ISOMETRIC AND ISOKINETIC STRENGTH TRAINING
Joseph J. Knapik, Roberta H. Mawdsley (Northern Illinois Univ.), and Marcos U. Ramos (Boston Univ. Hospital) 1983 29 p refs Submitted for publication
(AD-A124976; M5/83) Avail: NTIS HC A03/MF A01 CSCL 05/9

Six males and six females (X = 22.6 years) were assigned to groups which trained either isometrically (90 deg) or isokinetically (30 deg/sec). They trained their left elbow extensors at 80 percent of their maximum voluntary contraction on a modified Cybex apparatus for 10 weeks, three sessions per week, with 50 contractions per session. Before and after training, both groups were tested isometrically (70 deg, 90 deg, 110 deg) and isokinetically (30 deg/sec). When tested isometrically, both groups improved equally, and strength was increased at all three test angles to about the same extent. When tested isokinetically, both groups improved, but the isokinetic group improved to a greater extent. In conclusion, no angular specificity of training was demonstrated within 20 deg of the training angle, and no test mode specificity was seen for isometric testing. However, isometric training showed less transfer to an isokinetic test. Author (GRA)

N83-27586# Army Research Inst. of Environmental Medicine, Natick, Mass.
A LINEARIZED, TIME DEPENDENT MODEL OF THE HEAT TRANSFER AND THERMOREGULATORY RESPONSES OCCURRING UPON IMMERSION IN COLD WATER
Louis Strong and Ralph F. Goldman Mar. 1982 63 p refs
(DA Proj. 3E1-62777-A-878)
(AD-A124972; USARIEM-T-7/82) Avail: NTIS HC A04/MF A01 CSCL 06/19

Twenty males subjects (17 to 28 yrs of age) exhibiting a range of body weights (60 less than or = BW less than or = 95 Kg) and body fat (7% less than or = BF less than or = 23%) underwent total immersion while at rest in water between 36 C and 20 C. Their metabolic heat production, which were measured as functions of time and water temperature, were converted to explicit linear

functions of core (T sub re) and skin (T sub s) temperatures for each individual immersion. These were used to define planes of thermogenic activity which allowed the comparison of the onset and magnitude of shivering between individuals of any morphological group. These thermogenic planes show too much steeper slope with respect to the T sub s axis for small, thin men than for heavy, fat men, while men of average weight and fat composition exhibit an intermediate slope. Small, lean men also appear to exhibit thermogenic planes having steeper slopes with respect to the T sub re axis than do average and heavy men. Analysis showed that both metabolic and cardiovascular compensation occurs at higher bath temperatures for small, lean men than heavy fat men. It also showed that body size is more important than body fat content alone in determining maximal total internal insulation. The analysis showed that clothing can lower core temperature rather than elevate it, particularly for some heavy subjects by increasing internal conductances and lowering heat production. This occurs in the face of a net increase in external insulation. GRA

N83-27587# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
COMPARATIVE ANALYSIS OF POSITIVE AND NEGATIVE LATERAL ACCELERATION ON ISOMETRIC FATIGUE M.S. Thesis
Robert A. Johnson Dec. 1982 77 p refs
(AD-A124752; AFIT/GSO/EE/82D-1) Avail: NTIS HC A05/MF A01 CSCL 06/19

The USAF Advanced Fighter Technology Integration F-16 is a six degree of freedom aircraft capable of lateral acceleration as well as conventional modes of flight. The purpose of this investigation was to determine the difference, if any, produced by positive and negative lateral (Gy) acceleration on forearm fatigue. The Dynamic Environment Simulator (DES) at the USAF Aerospace Medical Research Laboratory was used to create a lateral acceleration environment. The DES and surface electromyogram (EMG) techniques were used to measure any differences in isometric strength, endurance, and recovery from fatigue observed in the handgrip muscles of the right forearm under + or - 2 Gy acceleration. Also, quantification of the fatigue produced by + or - 2 Gy acceleration was investigated. The results of this study indicate that isometric performance was degraded under -2 Gy acceleration compared to +2 Gy acceleration. A reasonable explanation for the degradation was radial nerve entrapment during -2 Gy acceleration caused by the restraint system being used. The percentage drop in center frequency of the EMG signal was determined unreliable as a fatigue index under lateral acceleration. GRA

N83-27588# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A MODEL FOR HUMAN VISUAL PROCESSING WHICH EXPLAINS PERCEPTIONS OF MOTION-AFTER-EFFECTS M.S. Thesis
Roger L. Carter Dec. 1982 135 p refs
(AD-A124842; AFIT/GE/EE/82D-23) Avail: NTIS HC A07/MF A01 CSCL 05/10

A theoretical model for human visual information processing was developed which attributes functional roles to the cerebellum, lateral geniculate nucleus, and cerebral cortex. The lateral geniculate nucleus is believed to provide sequential monocular mappings as inputs to the primary visual cortex, which uses this information for binocular integration, detection of motion, and other of its functions. In an experiment with the limits of human binocular fusion, two separate limits were discovered. When dichoptic images are first perceived to represent a single object, the limit for fusion is greater than when no initial reference for a single object association is given. A second experiment measured the stimulus duration thresholds for motion-after-effects. Correlation of performance by subjects in the two experiments was used to conclude that similar mechanisms are involved in binocular fusion and the processing of perceptions leading to motion-after-effects. GRA

N83-27573# Joint Publications Research Service, Arlington, Va.
EFFECT OF DECIMETER WAVES ON FUNCTIONAL STATE OF CARDIOVASCULAR SYSTEM, SOME BIOCHEMICAL AND IMMUNOLOGICAL PARAMETERS OF PATIENTS RECOVERING FROM MYOCARDIAL INFARCTION
Ye. I. Sorokina, N. B. Poshkus, Yu. Yu. Tupitsina, L. P. Volkova, A. V. Shubina, and V. Ye. Krasnikov *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 9 (JPRS-83601) 3 Jun. 1983 p 1-5 refs Transl. into ENGLISH from Vopr. Kurortol. Fizioter. Lech. Fiz. Kult. (Moscow), no. 2, Mar.-Apr. 1982 p 9-13 (For primary document see N83-27572 16-51)
Avail: NTIS HC A03

N83-27574# Joint Publications Research Service, Arlington, Va.
MORPHOLOGICAL EFFECTS OF CHRONIC ACTION OF SHF FIELD ON NERVOUS SYSTEM OF MICE
V. V. Antipov, V. I. Drobyshev, V. S. Tikhonchuk, V. P. Fedorov, and L. V. Pakhunova *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 9 (JPRS-83601) 3 Jun. 1983 p 14-20 refs Transl. into ENGLISH from Med. Radiol. (Moscow), no. 7, Jul. 1982 p 58-62 (For primary document see N83-27572 16-51)
Avail: NTIS HC A03

N83-27575# Joint Publications Research Service, Arlington, Va.
INVESTIGATION OF ADAPTIVE PROCESSES IN PERIPHERAL BLOOD USING MATHEMATICAL MODELING METHODS
M. Yu. Antomonov and N. M. Gonchar *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 9 (JPRS-83601) 3 Jun. 1983 p 21-28 refs Transl. into ENGLISH from Radiobiol. (Moscow), v. 22, no. 6, Nov-Dec. 1981 p 805-809 (For primary document see N83-27572 16-51)
Avail: NTIS HC A03

N83-27576# Joint Publications Research Service, Arlington, Va.
FUNCTION OF ADRENO-PITUITARY SYSTEM IN VARIOUS REGIMES OF EFFECT OF ALTERNATING MAGNETIC FIELD OF INDUSTRIAL FREQUENCY
N. A. Udintsev and V. V. Moroz *In its* USSR Rept.: Life Sci. Effects of Nonionizing Electromagnetic Radiation, No. 9 (JPRS-83601) 3 Jun. 1983 p 29-35 refs Transl. into ENGLISH from Gig. Tr. Prof. Zabol. (Moscow), no. 12, Dec. 1982 p 54-56 (For primary document see N83-27572 16-51)
Avail: NTIS HC A03

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N83-27589# Illinois Univ., Urbana. Electro-Physics Lab.
S-C-R COMPATIBILITY AND DUAL TASK PERFORMANCE IN TWO COMPLEX INFORMATION PROCESSING TASKS: THREAT EVALUATION AND FAULT DIAGNOSIS
Christopher D. Wickens and Micheal Vidulich Dec. 1982 47 p refs
(Contract N00014-79-C-0658; NR Proj. 196-158)
(AD-A124340; EPL-82-3/ONR-82-3) Avail: NTIS HC A03/MF A01 CSCL 05/10

This experiment was conducted to extend the principles of stimulus/central-processing/response or S-C-R compatibility, described in an earlier report by Sandry and Wickens, to a more complex environment. The principle states that tasks with verbal central-processing demands will be best served by voice input and output channels. Tasks with spatial demands will be best served by visual/manual channels. A verbal task requiring subjects to proceed through a hierarchical checklist of systems and components to ascertain their status (fault), is time-shared with a spatial task, requiring subjects to evaluate the relative velocity vector of two aircraft for the likelihood of interception. In different conditions each of these were served by both input and output

modalities, in single and dual task configurations. The general results indicated that anticipated compatibility effects were obtained and often enhanced under dual task conditions. In particular, in some circumstances compatibility effects dominated those of resource competition. That is, performance on both tasks in a dual task pair was better when they shared a common input channel, but were both S-C compatible, than when they shared different channels, but one was incompatibly displayed. The practical implications of these results to the interfacing of tasks wit voice recognition and synthesis technology are discussed.
Author (GRA)

N83-27590# Vanderbilt Univ., Nashville, Tenn. Dept. of Psychology.
THE ROLE OF CONVERGENCE IN STEREOSCOPIC DEPTH CONSTANCY
Robert Cormack and Arthur Menendez Jan. 1983 34 p refs
(Contract N00014-81-C-0001; NR Proj. 197-067; RR0420902)
(AD-A124231; N14-0001-83C-0001) Avail: NTIS HC A03/MF A01 CSCL 05/10

In order for retinal disparity to be used in making veridical depth judgments, stereoscopic depth constancy must occur. That is, retinal disparity must be rescaled as a function of fixation distance. This is necessary because the retinal disparity associated with a given depth interval varies with the overall distance of the depth interval from the observer. Since accurate depth judgments based on retinal disparity can be made over a wide range, such a rescaling must be made. For both theoretical and practical reasons, it is of importance to know the source of information used by the visual system to recalibrate retinal disparity as fixation distance changes. The present study assessed the importance of convergence in the rescaling of retinal disparity. The results showed no consistant effects of 5 disopters of convergence. These findings show that convergence cannot be the sole source of distance information for rescaling retinal disparity. They suggest that, in the presence of other sources of distance information, convergence plays a minor role in stereoscopic depth constancy. Finally, these data demonstrate the useful-relating to stereoscopic depth perception. GRA

N83-27591# Brandeis Univ., Waltham, Mass.
COMPONENTS OF MENTAL IMAGERY REPRESENTATION
Stephen M. Kosslyn, Jennifer L. Brunn, Kyle R. Cave, and Roger W. Wallach 24 Jan. 1983 120 p refs Prepared in cooperation with Harvard Univ.
(Contract N00014-79-C-0982; NR Proj. 150-442)
(AD-A124616; TR-1) Avail: NTIS HC A06/MF A01 CSCL 05/10

The key question asked here was, is mental imagery ability an undifferentiated general skill, or is it composed of a number of distinct subabilities? Further, if imagery is not an undifferentiated general ability, can its structure be understood in terms of the processing components posited by the Kosslyn & Shwartz theory of imagery representation? A set of tasks was administered to a group of 50 people, and a model was specified for each task. These models invoked different combinations of the processing components posited by the theory. Each subject was assigned a z score on each measure. The z scores from the different tasks were then correlated, revealing a very wide range of coefficients--which suggests that the subjects were not simply good or poor at imagery in general. In addition, the similarity of each pair of processing models was computed by considering the number of common processing components posited by the theory. The correlation s among z scored were then compared to the predicted similarities in processing, and were found to be highly related to these measures. This result suggests that the z scores for task performance in part reflected the efficiency of the underlying processing components, and that for a given persons tasks sharing more components tended to be similar in difficulty. Thus, imagery ability is not an undifferentiated general skill, and the underlying components bear a strong correspondence to those posited by the theory. Various additional analyses, considering alternative conceptions and different ways of treating the data, supported these conclusions. Author (GRA)

N83-27592# Pittsburgh Univ., Pa. Learning Research and Development Center.
KNOWLEDGE AND SKILL DIFFERENCES IN NOVICES AND EXPERTS Final Technical Report, 1 May 1978 - 31 Jul. 1981
Michelene T. H. Chi and Robert Glaser 1 Dec. 1982 32 p refs
(Contract N00014-78-C-0375; NR Proj. 157-430)
(AD-A124466; UPITT/LRDC/ONR/KBC-7) Avail: NTIS HC A03/MF A01 CSCL 05/10

The objective of this research is to construct a theory of expertise based upon empirical description of expert problem solving abilities in complex knowledge domains. Our goal is to develop a theory that is representative enough to encompass both analytical types of problem solving (such as, solving problems in physics), as well as more spatial types of problem solving (such as maneuvering in a large-scale environment). Our work in the past three years has proceeded in these two directions. A major interest of the project is to determine the extent to which there are skills that are generalized across domains, and skills that are domain-specific. the practical outcome of our work is the identification of dimensions of expertise that can be taken into account in training and assessing the attainment of high-level competence.
GRA

N83-27593# Navy Personnel Research and Development Center, San Diego, Calif.
VALIDATION OF BRAIN EVENT-RELATED POTENTIALS AS INDICATORS OF COGNITIVE STYLES, ABILITIES, AND APTITUDES Interim Report, Oct. 1979 - Oct. 1980
Pat-Anthony Federico, Jeffrey N. Froning, and Marlene Calder Feb. 1983 43 p refs
(ZF63522010)
(AD-A125292; NPRDC-TR-83-11) Avail: NTIS HC A03/MF A01 CSCL 05/10

Fifty Navy recruits were given 11 paper-and-pencil tests of cognitive styles, abilities, and aptitudes. Visual, auditory, and bimodal brain even-related potential (ERP) amplitudes were recorded from each of these subjects. Product-moment and cononical correlational analyses, as well as principal-factor analysis and varimax rotation, were conducted. Product-moment correlations indicated that some cognitive attributes were significantly associated with some ERPs. Cognitive characteristics that contributed to the the significant canonical correlations were general aptitude, verbal comprehension, spatial ability, field dependence-independence, conceptualizing style, and reflection-impulsivity, as well as ERPs in the right temporal and parietal areas and left frontal and parietal areas. Some ERPs and cognitive characteristics defined the same underlying dimensions, implying that they are related. The results demonstrated the construct validity of ERPs as indicators of individual differences in cognitive characteristics, especially crystallized and fluid intelligence. Author (GRA)

N83-27594# School of Aerospace Medicine, Brooks AFB, Tex. Biomathematics Modeling Branch.
ESTIMATING AIRCREW FATIGUE: A TECHNIQUE WITH APPLICATION TO AIRLIFT OPERATIONS Final Report, Oct. 1980 - Sep. 1981
Sherwood W. Samn and Layne P. Perelli Dec. 1982 29 p refs
(AF Proj. 7930)
(AD-A125319; SAM-TR-82-21) Avail: NTIS HC A03/MF A01 CSCL 06/19

This report proposes a method of assessing aircrew fatigue based on work/rest profiles. Possible circadian desynchronization and cumulative fatigue an aircrew may have experienced are considered. The method was used to assess aircrew fatigue during computer-simulated airlift operations. It shows quantitatively how flying-hour limitations can affect average aircrew fatigue and system performance. Author (GRA)

N83-27595# ALPHATECH, Inc., Burlington, Mass.
MODELING HUMAN DECISION PROCESSES IN COMMAND AND

CONTROL Technical Report, Sep. 1981 - Sep. 1982
Joseph G. Wohl, Elliot E. Entin, and John S. Eterno 14 Feb. 1983 72 p refs
(Contract N00014-81-C-0740; NR Proj. 460-001)
(AD-A125218; TR-137; TR-1) Avail: NTIS HC A04/MF A01 CSCL 05/10

The primary goal of this ongoing project is to model human behavior in specific situations and, in particular, to model high-level decisionmaking for antisubmarine warfare commanders. To abet this modeling effort the SHOR paradigm is presented as a structure for analyzing human cognitive decisionmaking. SHOR describes decisionmaking as a cascading of four activities, they are: information processing, hypothesis generation and evaluation, option generation and evaluation, and decision execution. The commander's decisionmaking process is cast into the SHOR framework. A Bayesian (optimal) mathematical model of the decisionmaker's hypothesis evaluation procedure is developed. The inputs to the model are the hypotheses and sensor data, and its outputs are the posterior probabilities of the hypotheses' being true and their respective states of nature. It is assumed that these outputs are sufficient for the commander to perform the option generation and evaluation activities. A brief example of how the posterior probabilities of the hypotheses evolve in the light of new data and implications of the model are presented.
Author (GRA)

N83-27596# Stanford Univ., Calif. Dept. of Psychology.
PSYCHOLOGICAL AND SYSTEM VARIABLES IN TEAM PROBLEM SOLVING: EXPERIMENTAL STUDIES OF COMPUTER-MEDIATED PARTICIPATION
Philip G. Zimbardo, Joan A. W. Linsenmeier, Peter G. Smith, and Loren G. Kabat (State Univ. of New York) Dec. 1982 83 p refs
(Contract N00014-78-C-0425; NR Proj. 170-866)
(AD-A124924; Z-82-01) Avail: NTIS HC A05/MF A01 CSCL 05/10

A computer-mediated message handling system was developed and refined over the course of three experiments. Turn-taking rules and informational prompts (on-going feedback on rates of participation) were systematically varied during discussions held by four-person experimental teams engaged in problem-solving activities. Variations in shyness (or communication apprehension) and gender composition of the teams were found to influence the process of team problem solving. The extent of individual participation, perceptions of and social-emotional reactions to the group, and the quality of team decisions were modified in some instances by our interventions. We argue for the potential value of studying computer-mediated message systems and for their use as remedial interventions to help balance inequities in participation caused by learned patterns of inhibition, dominance and deference. Suggestions for future research utilizing this system are also presented.
Author (GRA)

N83-27597# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
COMPUTER SIMULATION OF A MULTIAXIS AIR-TO-AIR TRACKING TASK USING THE OPTIMAL PILOT CONTROL MODEL M.S. Thesis
William Allen Yucuis Dec. 1982 120 p refs
(AD-A125302; AFIT-CI-NR-82-62T) Avail: NTIS HC A06/MF A01 CSCL 09/2

The primary objective of the research is to simulate the multiaxis air-to-air tracking task and determine if the augmentation control synthesis results in improved piloted vehicle performance. Also, the simulation results will be compared to previously obtained analytical results to see if the optimal pilot control model should be modified. The simulation was accomplished on the Aeronautical Engineering minicomputer simulation system and the results substatiate the claim of improved performance. Since the analytical model and simulation task have different target motions, nothing definitive can be said about modifying the model. GRA

N83-27598# Research Inst. of National Defence, Stockholm (Sweden). Dept. 5.
SURVIVAL; MOTIVATION; PREPARATION
Ulf Bergh, Arne Groth, Stefan Kaellman, and Aasa Braend-Persson Feb. 1983 22 p In SWEDISH; ENGLISH summary Conf. on Survival Res., Stockholm, 20-21 Oct. 1982; sponsored by Research Institute of National Defence
(FOA-C-54045-H1) Avail: NTIS HC A02/MF A01

Problems of survival, especially for armed forces, and research needs in this area were discussed. Bivouacs, fire, food and water supply, heating problems, treatment of injuries and equipment for primitive conditions arising from emergencies were considered.
Author (ESA)

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N83-27599# Naval Weapons Center, China Lake, Calif.
HUMAN INFORMATION PROCESSING GUIDELINES FOR DECISION-AIDING DISPLAYS
M. J. Barnes Dec. 1981 44 p refs
(AD-A124858; NWC-TM-4605) Avail: NTIS HC A03/MF A01 CSCL 05/8

Decision-aiding is one means of alleviating the high workload and time constraints typical of combat situations. The purpose of a decision-aid is to reduce the operator's imformation processing load while structuring the problem so that the operator can make the final choice. As opposed to automation, the operator is not replaced in the decision loop, instead he is freed from complex computational, memorial and processing requirements allowing him to concentrate on the consequences of the action he selects. This report is the result of a literature search of human information processing research. The purpose was to provide baseline data from which decision-aid design guidelines could be developed. A decision aid does not replace the operator but rather interacts with the operator as part of a decision-making system therefore some indication of how the human processes and remembers information is necessary in order to design such an aid. The general outline of the report will consist of two major areas: (1) human memory systems and (2) human processing systems. GRA

N83-27600# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
QUATERNIONS IN COMPUTER VISION AND ROBOTICS
Edward Pervin and Jon A. Webb 1982 17 p refs
(Contract F33615-78-C-1551; ARPA Order 3597)
(AD-A125876; CMU-CS-82-150) Avail: NTIS HC A02/MF A01 CSCL 12/1

Computer vision and robotics suffer from not having good tools for manipulating three-dimensional objects. Vectors, coordinate geometry, and trigonometry all have deficiencies. Quaternions can be used to solve many of these problems. Many properties of quaternions that are relevant to computer vision and robotics are developed. Examples are given showing how quaternions can be used to simplify derivations in computer vision and robotics.
Author

N83-27601# Los Alamos Scientific Lab., N. Mex.
EVALUATION AND PERFORMANCE OF CLOSED-CIRCUIT BREATHING APPARATUS
Alan Hack, Andres Trujillo, O. D. Bradley, and Keith Carter Apr. 1982 22 p refs
(Contract W-7405-eng-36)
(DE82-015877; NUREG/CR-2652; LA-9266-MS) Avail: NTIS HC A02/MF A01

Seven closed circuit self contained breathing apparatus were worn by a panel of anthropometrically selected test subjects to determine the protection provided by each. The types included those that supply breathing gas continuously, or on demand, or a combination of both. One unit maintained a positive pressure and

provided higher protection than the others. Device performance by facial size is discussed. DOE

N83-27602# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho. Operational Safety Div.
OPERATIONAL READINESS AND THE HUMAN FACTORS ENVIRONMENT
Lawrence R. Klinestiver 1982 5 p refs Presented at the SAFF Symp., Las Vegas, Nev., 5 Dec. 1982
(Contract DE-AC07-76ID-01570)
(DE83-005586; EGG-M-22082; CONF-821225-1) Avail: NTIS HC A02/MF A01

Personnel readiness as it applies to hardware, procedures, and management controls is defined. Task performance factors and interface factors that affect operational organizations and developmental programs are presented. Operational readiness, as far as personnel are concerned in the industrial and aerospace industry, is affected by human factors such as physiological, psychological, and environmental. Plant hardware, procedures, and management control are also indirectly involved. DOE

N83-27603# Lulea Univ. (Sweden). Dept. of Human Work Sciences.
THE VDU OPERATORS' PREFERRED ENVIRONMENTAL CONDITIONS IN A TELEPHONE INFORMATION CENTER
Houshang Shahnavaz 1982 34 p refs Sponsored by Swedish Telephone Co.
(TULEA-1982-11; ISSN-0347-0881) Avail: NTIS HC A03/MF A01

Environmental conditions such as lighting, workplace dimensions, and factors related to the visual display units were measured during day and night shifts for 28 operators at a telephone information center. A universal photometer, a photometer-radiometer, and an automatic spectroradiometer were used for light measurement. Results of the survey show that the operators in general prefer much lower luminance and or work place illuminance than previously reported. Large inter-individual differences in screen and workplace lighting adjustment were also revealed. Author (ESA)

55 PLANETARY BIOLOGY

Includes exobiology; and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

No abstracts in this category.

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.

For components see *33 Electronics and Electrical Engineering.*

N83-27604# General Accounting Office, Washington, D. C. Accounting and Financial Management Div.
SMALL COMPUTERS IN THE FEDERAL GOVERNMENT: MANAGEMENT IS NEEDED TO REALIZE POTENTIAL AND PREVENT PROBLEMS
W. D. Campbell 8 Mar. 1983 8 p
(GAO/AFMD-83-36; B-210716) Avail: NTIS HC A02/MF A01

Trends in the use of small computers, management issues relative to the use of small computers, addressing small computer issues, private sector concerns broader implications of small computer problems, and concerns are discussed. Author

N83-27605# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
FORTRAN BASED LINEAR PROGRAMMING FOR MICROCOMPUTERS M.S. Thesis
Theodore R. E. Fraley and Dale A. Kem Dec. 1982 439 p refs
(AD-A124804; AFIT/GOR-OS-820-4) Avail: NTIS HC A19/MF A01 CSCL 12/1

Linear programming is an analytical technique used in decision analysis. This paper describes the development and use of a highly interactive, non-programmer oriented, linear programming software package implemented on a microcomputer. This software, written in FORTRAN and supported by the UCSD PASCAL Operating System, has allowed increased portability while providing the capability of solving moderate-sized LP models. Also available are extensive postoptimal sensitivity analysis capabilities. The modularly implemented package provides interactive, instructional sessions with user input LP models. The user is guided through tableau formulation and pivot element selection to an optimal solution by a series of option displays and user selections. This module also provides instructors the ability to rapidly demonstrate the application of the simplex algorithm. A separate module provides a more rapid problem solution with minimal interaction. Options allow either primal or dual problem solution with screen-oriented output to either a monitor or printer. The sensitivity analysis capabilities include right-hand-side, cost coefficient, and constraint coefficient ranging. Also provided is the ability to add constraints and variables to the original model. Author (GRA)

N83-27606# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DESIGN OF A PROTOTYPE UNIVERSAL NETWORK INTERFACE DEVICE USING INTEL 8086 AND 8089 16-BIT MICROPROCESSORS M.S. Thesis
Donald E. Palmer Dec. 1982 194 p refs
(AD-A124834; AFIT/GE/EE/82D-52) Avail: NTIS HC A09/MF A01 CSCL 09/2

This research describes the development of a Universal Network Interface Device (UNID II) which is intended to function as a network node in a computer communications network. The UNID II is a 16-bit, 8086 microprocessor based version of the present 8-bit Z80A UNID being developed. In this report the detailed design, construction, and testing of the network module is documented. The network module was designed using the Intel 8086 microprocessor family of components, including an 8089 Input/Output processor. An Intel SBC 86/12A single board computer was used as the local module and its testing is also documented. The test were conducted with the aid of an Intel ICE-86A/88A In-Circuit Emulator. The tests conducted, verified the proper operation of the network module's bus interface circuitry, control circuitry, and DMA transfer capabilities. The shared memory, which is used for intercommunication between the two modules, was also successfully tested. The UNID II was not tested in a computer communications network environment. GRA

N83-27607# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A VISIT TO THE COMPUTER SCIENCE DEPARTMENT
Zhong Qing 11 Jan. 1983 11 p Transl. into ENGLISH from Hongkong Zhishi (China), no. 6, Jun. 1982 p 6-8
(AD-A124855; FTD-ID(RS)T-1722-82) Avail: NTIS HC A02/MF A01 CSCL 09/2

A tour of the Beijing Aeronautics Institute was conducted with emphasis on the computer science and engineering departments. Explanation of computer techniques, systems, and applications was described. B.G.

N83-27608# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THE X-Y DIGITAL PLOTTER AS AN OUTPUT UNIT FOR THE CDRA 1325 DIGITAL COMPUTERS

Urszula Kreglewska, Tomasz Kreglewska, and Andrzej Lewandowski 13 Jan. 1983 13 p refs Transl. into ENGLISH of Pomiary Automat. Kontr. (Poland), v. 23, no. 7, Jul. 1977 p 257-259 (AD-A124799; FTD-ID(RS)T-1456-82) Avail: NTIS HC A02/MF A01 CSCL 09/2

An electronics system as well as a programming system making it possible to adapt the X-Y Hewlitt-Packard digital plotter as an output unit for ODRA 1300 digital computes, with the plotter working in the tape punch channel is described. A system was developed and adopted for linking the type 9862 X-Y digital plotter made by Hewlitt-Packard with an ODRA 1325 computer. Innerworking between the plotter and the computer is made possible by means of a unit controlling a DT 325 perforated tape punch, together with a small system that adapts this unit for the requirements of the plotter. The DT 325 control unit operates the tape punch for the plotter depending on the positioning of an auxiliary switch. The set of procedures directly communicating with the plotter was written up and adopted; these procedures, after being added to the processing program, facilitate program operation of the plotter. Processing software was also developed. GRA

N83-27609# Georgia Inst. of Tech., Atlanta. Production and Distribution Research Center.

MATCHING BASED INTERACTIVE FACILITY LAYOUT

Benoit Montreuil (Univ. du Quebec a Trois-Rivieres), H. Donald Ratliff, and Marc Goetschalckx Jun. 1982 41 p refs (Contract N00014-80-K-0709) (AD-A124958; PDRC-82-02) Avail: NTIS HC A03/MF A01 CSCL 05/8

The problem of laying out facilities is very difficult from a practical as well as a methodological point of view. As a result the layout process generally involves a block layout phase and a detailed layout phase. During the block layout phase the various elements of the facility are aggregated into areas or blocks. Each block represents a department, office, or some other major work area. An attempt is then made to optimally position these blocks within the facility. Once the block layout is determined, a detailed layout is performed. This involves specifying the exact position of equipment and work areas within each block as well as the necessary support such as electric outlets, water, etc. Except for imposing certain restrictions on the size and shape of the blocks to insure that everything will fit, these details are essentially ignored in the block layout phase. We develop here an interactive approach to the block layout problem. The approach has three major components: an optimization model, a colorgraphics computer interface, and a human decision maker. The output from the model is displayed in network form on a colorgraphics terminal. The human decision maker utilizes this information together with his knowledge of the layout problem to selectively impose additional constraints on the model or to relax previously imposed constraints. The procedure iterates between the human decision maker and the optimization model, via the colorgraphics interface, until an acceptable layout is obtained. GRA

N83-27610# Auburn Univ., Ala.

ERROR ANALYSIS AND PREVENTION OF COSMIC ION-INDUCED SOFT ERRORS IN STATIC CMOS RAMS

S. E. Diehl, A. Ochoa, Jr. (Sandia Labs., Albuquerque, N. Mex.), P. V Dressendorfer (Sandia Labs., Albuquerque, N. Mex.), R. Koga (Aerospace Corp., Los Angeles, Calif.), and W. A. Kolasinski (Aerospace Corp., Los Angeles, Calif.) Jun. 1982 34 p refs Presented at the IEEE Ann. Conf. on Nucl. and Space Radiation Effect, Las Vegas, Nev., 20-22 Jul. 1982 (Contract DE-AC04-76DP-00789) (DE82-018967; SAND-82-0723C; CONF-820708-6) Avail: NTIS HC A03/MF A01

Cosmic ray interactions with memory cells are known to cause temporary, random, bit errors in some designs. The sensitivity of polysilicon gate CMOS static RAM designs to logic upset by impinging ions was studied using computer simulations and experimental heavy ion bombardment. Results of the simulations are confirmed by experimental upset cross section data. Analytical models were extended to determine and evaluate design modifications which reduce memory cell sensitivity to cosmic ions. A simple design modification, the addition of decoupling resistance in the feedback path, is shown to produce static RAMs immune to cosmic ray induced bit errors. DOE

N83-27611# Sandia Labs., Albuquerque, N. Mex.

APPLICATION OF A BUBBLE MEMORY TO A BALLOON-BORNE DATA SYSTEM

N. E. Corlis and G. C. Hauser 1982 17 p refs Presented at the Intern. Telemetering Conf., San Diego, Calif., 28 Sep. 1982 (Contract DE-AC04-76DP-00789) (DE82-018415; SAND-82-1020C; CONF-820920-3) Avail: NTIS HC A02/MF A01

An eight megabit bubble memory used as a mass memory storage device on a high altitude helium filled balloon flight package is described. The balloon flight designated as Gamma Ray VI was conducted in the fall of 1981 at Alice Springs, Australia. Eight one megabit Intel bubble modules were mounted on a custom designed multilayer printed wire board to maximize the memory in the available space. A microprocessor based data interface was designed to test and control the bubble memory. The selection of bubble memory modules for this application, the design considerations of the bubble printed wire board and the microprocessor interface are discussed. The flight test and results of Gamma Ray VI are described. DOE

N83-27612# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.

MICRO FOCUS LTD., INTEL MDS 231 (8080A), CIS COBOL V. 4.5 REV 1 (COBOL TECHNICAL REPORT)

31 Aug. 1982 18 p (PB83-155788; OSD/FSTC-82/162) Avail: NTIS HC A02/MF A01 CSCL 09B

This FCTC Technical Report for the MICRO FOCUS LTD, CIS COBOL V. 4.5 REV. 1 running under the CP/M Version 2.2 provides a consolidated summary of the results obtained from the evaluation of the subject compiler against the indexed 1-0 Level 1 Inter-Program Communication Level 2 of the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The technical report is made up of several sections showing all the descrepancies found, if any. A comparison report Validation Summary Report OSD/FSTC-82/160 provides information regarding the validation of the compiler as the Low-Intermediate Level of Federal Standard COBOL (FIPS PUB 21-1). GRA

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N83-27613# Polish Academy of Sciences, Warsaw. Computing Lab.

PAPERS ON TECHNIQUES OF PROGRAM DESIGN

Jacek Maczynski 1983 40 p refs (ISSN-0208-5658) Avail: Issuing Activity

The THOLOS package is an implementation of the combined strutt, curved beam and shell theory, for computation of displacements and forces in a prestressed concrete version of a nuclear reactor secondary containment building. The package consists of number of program modules designed to perform mappings from one abstract space to another, from a load space to an internal force space or to a displacement space. In the process of program design, requirements for the modules were spcified down to minor details. The formulae were put into a form suitable for rapid computation, and this obviously tends to obfuscate the program text, so as to make it, at times, difficult to read and interpret. Again, the shear bulk of the programs necessitated some concep-

tually guided organizing effort. To cope with this situation which might have easily resulted in undetected, or visually undetectable errors, special methods for program design and testing were devised and their philosophy is described. Author

N83-27614# National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
SCRAP: A LANGUAGE FOR SYSTEMS PROGRAMMING [SCRAP - 'N TAAL VIR STELSELPROGRAMMERING]
M. H. vanRooyen Apr. 1982 15 p refs In AFRIKAANS; ENGLISH summary
(CSIR-TWISK-263) Avail: NTIS HC A02/MF A01

The SCRAP language, which is a high level language that provides facilities for system programming, but can also be used in applications programming is discussed. The SCRAP is defined to meet the requirements of efficiency, modularity, readability, portability, and generality. The prominent features of the language are its well defined syntax, its modular structure and its machine dependent data types. E.A.K.

N83-27615# Weapons Systems Research Lab., Adelaide (Australia).
THE USE OF THE BLAKE COMPUTER PROGRAM TO CALCULATE THERMODYNAMIC PROPERTIES OF AUSTRALIAN-MADE GUN PROPELLANTS
A. R. Rye Apr. 1982 83 p
(AD-A118605; WSRL-0269-TR; AR-002-835) Avail: NTIS HC A05/MF A01 CSCL 20/13

The BLAKE computer program was used to calculate certain quantities required for gun interior ballistic simulation and prediction. Thermodynamic data for gun propellants manufactured in Australia, and several which are candidates for local production, are tabulated for reference. A summary of the theoretical framework of the program is included. Author

N83-27616# Maryland Univ., College Park. Computer Vision Lab.
USING PYRAMIDS TO DETECT GOOD CONTINUATION
T. H. Hong, M. Shneier, R. Hartley, and A. Rosenfeld Jul. 1982 28 p refs
(Contract DAAG53-76-C-0138; DARPA Order 3206)
(AD-A124848; TR-1185) Avail: NTIS HC A03/MF A01 CSCL 12/1

Pictures containing lines and curves are often perceived by humans as being composed of a smaller number of more global figures. For example, a broken set of collinear line segments is perceived as a single straight line, even in the presence of other overlapping line segments. This paper presents a method of extracting such figures from images automatically in a highly parallel manner. A pyramid of successively lower-resolution images is used to transform the problem from one of global search to one of local good continuation. Using the pyramid, figures that are both sparse and obscured can successfully be extracted and the background clutter can be suppressed. Author (GRA)

N83-27617# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
EFFICIENCY CONSIDERATIONS FOR C PROGRAMS ON A VAX (TRADEMARK) 11/780 Interim Report
Christopher J. VanWyk, Jon L. Bentley, and Peter J. Weinberger 4 Aug. 1982 20 p refs
(Contract N00014-76-C-0370)
(AD-A125209; CMU-CS-82-134) Avail: NTIS HC A02/MF A01 CSCL 09/2

Typical C programs are 'efficient enough' for most applications. If they are not, judicious improvement of the algorithms and data structures often can improve performance enough. Sometimes, even better performance is needed, and one must manipulate the C program in ways that depend on the language and the machine on which the application is running. In this paper the authors compare the efficiency of some C constructs and discuss some methods of improving the performance of C programs running VAX 11/780's. GRA

N83-27618# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School Of Engineering.
DEVELOPMENT OF A DESIGN AUTOMATION GRAPHICS WORK STATION M.S. Thesis
Donna Eileen Scott Dec. 1982 102 p refs
(AD-A124824; AFIT/GE/EE/82D-60) Avail: NTIS HC A06/MF A01 CSCL 09/2

As digital system complexities continue to increase, manual design, analysis, and fabrication methods have proved inadequate. Design Automation (DA) is the application of computers (with applicable software) to support designers or technicians in the design, fabrication, testing, and maintenance of a digital system. This report describes the development of a graphics work station which is intended to function as an Input/Output (I/O) processor in support of the Data Automation effort at the Air Force Institute of Technology (AFIT). This study focused on the requirements definition and design of the graphics workstation. Five I/O devices were acquired during this effort and were to be controlled by an M6800 microprocessor. A graphics generator was acquired to produce, store, and refresh the graphics display, freeing the microprocessor to collect and process other data. The hardware and software designs were completed and the hardware which was acquired was interfaced to the M6800. The present configuration of the M6800 EXORciser system prohibited the implementation of the graphics software, however, the device drivers were implemented and tested during this effort. Test software was generated and used to demonstrate the features of the system. GRA

N83-27619# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DEVELOPMENT OF COMPUTER PERFORMANCE EVALUATION TOOLS FOR VAX-11/780 COMPUTERS M.S. Thesis
Eugene C. Gilpin, Jr. Dec. 1982 230 p refs
(AD-A124904; AFIT/GCS/EE/82D-15) Avail: NTIS HC A11/MF A01 CSCL 09/2

This thesis reports on an effort to develop a computer performance software monitor for Digital Equipment Corporation's VAX-11/780 computers. The role of the monitor developed by this effort will be to address long-range, as well as short-range performance metrics for a VAX system. The scope of this effort was limited to a top-level design of the Performance Monitor Tool (PERMTOOL) coupled with a complete design and development of some components of the system. The system is designed to provide maximum user support through a wide range of possible measurement requirements, ranging from job parameter measurement to analyses of device utilizations within the VAX. The system has been designed to permit the user to specify activities in three major areas: data collection, data reduction, and data formatting/reporting. Once started, any such activities proceed independently of the rest of the PERMTOOL system. Both the design approach (top-down, modular) and the program methodology (structured) facilitate modifications to the PERMTOOL as changing requirements dictate. Several extensions of this effort are identified which seem worthy of additional research and development. Author (GRA)

N83-27620# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
THE EZDRAW: AN INTERACTIVE COMPUTER GRAPHICS PROGRAM TO DESIGN BAR, LINE OR PIE GRAPHS M.S. Thesis
Roldan Vea Dec. 1982 68 p refs
(AD-A124901; AFIT/GE/MA/82D-1) Avail: NTIS HC A04/MF A01 CSCL 09/2

This study initiates the development of an interactive computer graphics system. This included the integration of off-the-shelf CORE standard graphics software for use on several computer graphics refresh and raster display devices. The system was implemented on a Digital Equipment Corporation VAX 11/780 mini-computer in standard FORTRAN 77. The system's requirements and top-level design specifications were generated following a study of graphics design concepts. The operational requirements of Precision Visuals'

DI-3000 and GRAFMAKER software packages were interfaced with the system requirements to obtain the system level design specifications. The concepts of good interactive man-machine communication were included in the final design. This produced a reliable graphics system responsive to designers of bar, line, or pie graphs. The system was designed using structured analysis and design techniques which will allow a follow-on study to implement recommended modifications or enhancements from the supporting graphics software. Author (GRA)

N83-27621# Computer Corp. of America, Cambridge, Mass.
PROGRAM VISUALIZATION
Christopher F. Herot, Gretchen P. Brown, Richard T. Carling, and D. Kramlich 22 Feb. 1983 35 p refs
(Contract N00014-81-C-0456; ARPA Order 3958)
(AD-A125291; AR-1) Avail: NTIS HC A03/MF A01 CSCL 09/2

This paper reports on the design of a program visualization (PV) environment, intended to provide lifecycle support for software development. The PV environment will capitalize on recent progress in the graphical representation of information and low-cost color graphics, to provide designers and programmers with both static and dynamic (animated) views of systems. The aim is to support maintainers of large complex sofware systems. The PV system will, in effect 'open the side of the machine' to permit users to look inside and watch their programs run. In this paper, we survey categories of program illustrations and then present and motivate the design philosophy that we are pursuing for the PV environment. GRA

N83-27622# University of Southern California, Marina del Rey. Information Sciences Inst.
NIGEL: A SYSTEMIC GRAMMAR FOR TEXT GENERATION
William C. Mann and Christian M. I. M. Matthiessen Feb. 1983 82 p
(Contract F49620-79-C-0181)
(AD-A125253; ISI/RR-83-105) Avail: NTIS HC A05/MF A01 CSCL 09/2

Programming a computer to write text which meets a prior need is a challenging research task. As part of such research, NIGEL, a large programmed grammar of English, has been created in the framework of systemic linguistics begun by Halliday. In addition to specifying function and structures of English, NIGEL has a novel semantic stratum which specifies the situations in which each grammatical feature should be used. The report consists of three papers on NIGEL: an introductory overview, the script of a demonstration of its use in generation, and an exposition of how NIGEL relates to the systemic framework. Although the effort to develop NIGEL is significant both as computer science research and as linguistic inquiry the outlook of the report is oriented to its linguistic significance. GRA

N83-27623# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
AN INTERACTIVE AND AUTOMATED SOFTWARE DEVELOPMENT ENVIRONMENT M.S. Thesis
Steven M. Hadfield Dec. 1982 378 p refs
(AD-A124872; AFIT/GCS/EE/82D-17) Avail: NTIS HC A17/MF A01 CSCL 09/2

The purpose of this investigation is to define both the detailed requirements and the preliminary design for an automated and interactive software development environment, and develop an initial implementation of that environment. The specified requirements for this environment emphasize the need to support the entire software life-cycle as a continuous and iterative process. In particular, the concepts of integration, traceability, flexibility, and user-friendliness are accentuated. The preliminary design delineates the high level design specifications, configurations schemes, and generic tool categories with which the previously mentioned requirements may be satisfied. Detailed designs are developed for the integrating interface/controller sub-system and the development data storage scheme for the initial implementation of the environment. The interface/controller sub-system has been implemented and testing using the DEC Command Language (DCL) and PASCAL. This sub-system is integrated with an initial software development tool set executing on the VAX-11/780 computer using the VMS operating system. This initial implementation, called the Software Development Workbench (SDW), is an extremely effective and easy to use aid for extending the cognitive and notational powers of the software developer. Author (GRA)

N83-27624# Naval Postgraduate School, Monterey, Calif.
HAND-HELD COMPUTER PROGRAMS FOR PRELIMINARY HELICOPTER DESIGN M.S. Thesis
Paul John Fardink Oct. 1982 180 p refs
(AD-A125036) Avail: NTIS HC A09/MF A01 CSCL 09/2

This project gives the user of the HP-41 handheld programmable calculator a series of programs that give acceptable results during the preliminary phases of the helicopter design process. The project consists of three parts. The first part consists of several short programs and their subroutine form. These programs and subroutines compute density altitude, density, disc area, solidity, tip velocity, induced velocity, coefficient of thrust, tip loss factor, equivalent chord, and ground effect. The second part consists of major subroutines. These subroutines compute profile power, induced power, climb power, parasite power, and total power; equivalent area and induced power for tandem rotor; and data input and change. The third part consists of the main programs. These programs compute the various power requirements for hovering flight, forward (straight and level), flight, vertical flight, and foward climbing flight; also tail rotor power, autorotative flight, and tandem rotor flight. GRA

N83-27625# Sandia Labs., Albuquerque, N. Mex.
DESCRIPTION AND OPERATING PROCEDURE FOR MAGMA CHARACTERIZATION DATA ACQUISITION AND CONTROL SYSTEM
M. H. Woodward Apr. 1982 64 p refs
(Contract DE-AC04-76DP-00789)
(DE82-015653; SAND-82-0505) Avail: NTIS HC A04/MF A01

A computerized data acquisition and control system used in a Sandia National Laboratories' facility for molten rock (magna) and metallurgical pressure bonding experiments is described. The system is based on a Hewlett-Packard 9826A Desktop Computer and a Hewlett-Packard 3497A Data Acquisition/Control Unit. Operating procedures are included, and detailed instructions for implementing the procedures are given. DOE

N83-27626# Sandia Labs., Albuquerque, N. Mex.
USE OF THE C LANGUAGE PRE-PROCESSOR IN THE RT-11 FORTRAN ENVIRONMENT
W. L. Jacklin 1982 12 p refs Presented at Spring DECUS Symp., Altanta, 10 May 1982
(Contract DE-AC04-76DP-00789)
(DE82-010076; SAND-82-0297C; CONF-820515-1) Avail: NTIS HC A02/MF A01

The use of the C language macro pre-processor, which works on any file containing ASCII characters and is particularly useful in overcoming some of FORTRAN'S limitations, is described. It is a software development tool that permits the programmer to: (1) keep all code segments used in a number of related routines (such as COMMON blocks) in one file which is included in others as necessary; (2) conditionally include code segments based on parameters defined at compile time; (3) define array size and processing bounds with a compile time constant; and (4) nest the above devices in a recursive manner. The pre-processor is used in stand-alone mode as a tool in working with program documentation files. It is particularly useful in dealing with some of the shortcomings of FORTRAN. The use of the pre-processor as it might be used by the FORTRAN programmer is described, and some examples of its use are given. DOE

N83-27627# Oak Ridge National Lab., Tenn.
THE ISOLR: AN ISOMETRIC PLOTTING PACKAGE FOR USE WITH ORPLOT
Z. W. Bell May 1982 29 p refs
(Contract W-7405-eng-26)

(DE82-015819; ORNL/TM-8192) Avail: NTIS HC A03/MF A01

An isometric plotting package is described. It is written entirely in FORTRAN and is designed to work in conjunction with ORPLOT, a general purpose plotting package in use at the ORELA PDP-10. The isometric plotter supports views from any point in space, logarithmic scales, and hidden lines. DOE

N83-27628# Pacific Northwest Lab., Richland, Wash.
ANALYSIS OF ANSI N13.11: THE PERFORMANCE ALGORITHM
P. L. Roberson, R. T. Hadley, and M. R. Thorson Jun. 1982 13 p refs Presented at the 27th Ann. Meeting of the Health Physics Society, Las Vegas, Nev., 30 Jun. 1982
(Contract DE-AC06-76RL-01830)
(DE82-019212; PNL-SA-10119; CONF-820655-7) Avail: NTIS HC A02/MF A01

The method of performance testing for personnel dosimeters specified in draft ANSI N13.11, Criteria for Testing Personnel Dosimetry Performance is evaluated. Points addressed are: (1) operational behavior of the performance algorithm; (2) dependence on the number of test dosimeters; (3) basis of choosing an algorithm; and (4) other possible algorithms. The performance algorithm evaluated for each test category is formed by adding the calibration bias and its standard deviation. This algorithm is not optimal due to a high dependence on the standard deviation. The dependence of the calibration bias on the standard deviation is significant because of the low number of dosimeters (15) evaluated per category. For categories with large standard deviations the uncertainty in determining the performance criterion is large. To have a reasonable chance of passing all categories in one test, we required a 95% probability of passing each category. Then, the maximum permissible standard deviation is 30% even with a zero bias. DOE

N83-27629# Oak Ridge National Lab., Tenn.
NEW FORTRAN COMPUTER PROGRAMS TO ACQUIRE AND PROCESS ISOTROPIC MASS-SPECTROMETRIC DATA
D. H. Smith Aug. 1982 100 p refs
(Contract W-7405-eng-26)
(DE82-019901; ORNL/TM-8356) Avail: NTIS HC A05/MF A01

The computer programs to acquire and process isotopic mass spectrometric data were revised. The operation of these programs is described. Both functional and overall design aspects are addressed. The three basic program units - file manipulation, data acquisition, and data processing - are discussed in turn. Step-by-step instructions are included where appropriate, and each subsection is described in enough detail to give a clear picture of its function. Organization of file structure, which is central to the entire concept, is extensively discussed with the help of numerous tables. Appendices contain flow charts and outline file structure to help a programmer unfamiliar with the programs to alter them with a minimum of lost time. DOE

N83-27630# Argonne National Lab., Ill.
NATIONAL ENERGY SOFTWARE CENTER: COMPILATION OF PROGRAM ABSTRACTS
M. Birgersson, M. K. Butler, and M. M. DeBruler Sep. 1982 967 p
(Contract W-31-109-eng-38)
(DE83-001550; ANL-7411-Rev-Suppl-1) Avail: NTIS HC A99/MF A01

A complete collection of abstracts of programs in the National Energy Software Center is presented. History and acknowledgements, abstract format, recommended program package contents, subject classification guide and the thesaurus used to index the programs are given. DOE

N83-27631# Pacific Northwest Lab., Richland, Wash.
USER MANUAL AQUASTOR: A COMPUTER MODEL FOR COST ANALYSIS OF AQUIFER THERMAL-ENERGY STORAGE COUPLED WITH DISTRICT HEATING OR COOLING SYSTEMS. VOLUME 2: APPENDICES
H. D. Huber, D. R. Brown, and R. W. Reilly Apr. 1982 170 p 2 Vol.
(Contract DE-AC06-76RL-01830)
(DE82-013889; PNL-4236-Vol-2) Avail: NTIS HC A08/MF A01

A computer model called AQUASTOR was developed for calculating the cost of district heating (cooling) using thermal energy supplied by an aquifer thermal energy storage (ATES) system, the AQUASTOR Model can simulate ATES district heating systems using stored hot wate or ATES district cooling systems using stored chilled water. AQUASTOR simulates the complete ATES district heating (cooling) system, which consists of two principal parts: the ATES supply system and the district heating (cooling) distribution system. The supply system submodel calculates the life-cycle cost of thermal energy supplied to the distribution system by simulating the technical design and cash flows for the exploration, development, and operation of the ATES supply system. The distribution system submodel calculates the life-cycle cost of heat (chill) delivered by the distribution system to the end-users by simulating the technical design and cash flows for the construction and operation of the distribution system. DOE

N83-27632# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
MICRO FOCUS LTD., INTEL SERIES 2, LEVEL 2 COBOL V.2.2
31 Aug. 1982 74 p
(PB83-147603; OSD/FSTC-82/161) Avail: NTIS HC A04/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the MICRO FOCUS LTD., Level II COBOL Version X1.1 running under the CP/M Version 2.2 provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated against the HIGH level of FIPS PUB 21-1. The VSR is made up of several sections showing all the discrepancies found, if any. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language, and a detailed listing of discrepancies together with the tests which failed. GRA

N83-27735# Atomic Energy of Canada Ltd., Chalk River (Ontario). Accelerator Physics Branch.
A BEAM CAVITY INTERACTION COMPUTER CODE FOR LINACS
K. C. D. Chan and J. McKeown *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 46-48 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27749# Maryland Univ., College Park.
ULTRAFISH: GENERALIZATION OF SUPERFISH TO m EQUAL TO OR LESS THAN 1
Robert L. Gluckstern, Ronald F. Holsinger (Field Effects, Inc., Carlisle, Mass.), Klaus Halbach (LBL), and Gerald N. Minerbo (LASL) *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 102-107 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27751# Max-Planck-Institut fuer Plasmaphysik, Garching (West Germany).
COMPUTER SIMULATION OF LONGITUDINAL-TRANSVERSE SPACE CHARGE EFFECTS IN BUNCHED BEAMS
I. Hofmann and I. Bozsik *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 116-119 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27768# Fukui Univ. (Japan).
A PROGRAM DEVELOPMENT FOR SUPERFISH
Shoji Okumura *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 200-202 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

62 COMPUTER SYSTEMS

Includes computer networks.

N83-27633*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
NETWORKING DEC AND IBM COMPUTERS
W. H. Mish May 1983 16 p refs
(NASA-TM-85019; NAS 1.15:85019) Avail: NTIS HC A02/MF A01 CSCL 09B

Local Area Networking of DEC and IBM computers within the structure of the ISO-OSI Seven Layer Reference Model at a raw signaling speed of 1 Mops or greater are discussed. After an introduction to the ISO-OSI Reference Model nd the IEEE-802 Draft Standard for Local Area Networks (LANs), there follows a detailed discussion and comparison of the products available from a variety of manufactures to perform this networking task. A summary of these products is presented in a table. Author

N83-27634# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A SECURE COMPUTER NETWORK M.S. Thesis
Jay Stephen Steinmetz Nov. 1982 114 p refs
(AD-A124820; AFIT/GCS/EE/82D-34) Avail: NTIS HC A06/MF A01 CSCL 09/2

In this thesis, the initial design for a secure computer network is developed. The requirement for a secure computer network is based on the need to protect sensitive and personal information currently processed by computer networks. The concepts of physical security, reference monitors, encryption, and network protocols are presented. Then, the top-level design of the secure computer network is developed. This design consists of secure data bases controlled by Kernelized secure operating systems which are connected by a secure communications subnetwork. The phases of secure communications: location, identification, request, and request response are discussed. A model for the secure communications subnetwork is then presented. This model relies on two major components: Secure Network Interface Computers (SNICs) and a Network Directory and Security Center (NDSC). A finite state analysis of the communication channels demonstrates the security of the model. Recommendations are presented to continue the development of this secure network. Author (GRA)

N83-27635# Los Alamos Scientific Lab., N. Mex.
BRINGING A LARGE COMPUTER NETWORK INTO FOCUS
Norman R. Morse and Joseph L. Thompson 1982 12 p refs Presented at the 6th Intern. Conf. on Software Eng., Tokyo, 13-16 Sep. 1982
(Contract W-7405-eng-36)
(DE82-010412; LA-UR-82-83; CONF-820902-1) Avail: NTIS HC A02/MF A01

The development and implementation of the Facility for Operations Control and Utilization Statistics (FOCUS), a new centralized node in the Integrated Computing Network of the Los Alamos National Laboratory is described. FOCUS consists of production control, performance measurement, and network information subsystems. The software engineering practices on which the development was based are discussed, with emphasis on the application of those practices to network systems development. DOE

N83-27636# California Univ., Livermore. Lawrence Livermore Lab.
PROTOCOL TRANSLATION AND TRANSLATORS FOR HETEROGENEOUS COMPUTER NETWORKS Ph.D. Thesis
Michael M. Ong Mar. 1982 197 p refs
(Contract W-7405-eng-48)
(DE83-007379; UCRL-53371) Avail: NTIS HC A09/MF A01

This dissertation describes a solution to the problem of interconnecting heterogeneous computers by means of protocol translation in a multinetwork environment. Despite the effort of standards organizations to bring uniformity to the computer network industry, many different types of networks continue to be produced because of the demands for different network services. One solution for interconnecting the networks is protocol translation. Protocol translation is analyzed with the help of physical and mathematical models. Guided by the models, the very complex problem of general translation is simplified by identifying an internetwork standard. This standard was established by examining the operations and services of computer networks, and the result is six classes of data. According to the models, a translator is composed of two different emulators and a mapping function which operates on data from the six data classes. Some upper bonds concerning the sharing of resources in translation will also be diagrammatically represented. DOE

63 CYBERNETICS

Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support.*

N83-27637# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A NEW APPROACH FOR SOLVING SIMULTANEOUS RESOURCE POSSESSION PROBLEMS IN CLOSED QUEUEING NETWORKS M.S. Thesis
Darral J. Freund Dec. 1982 210 p refs
(AD-A124877; AFIT/GCS/MA/82D-2) Avail: NTIS HC A10/MF A01 CSCL 12/1

A new approximate technique is presented for analyzing closed queueing networks with simultaneous resource possession. It is an analytic noniterative solution procedure that is suitable for multiple entry systems such as I/O (input output) models. It relies on solving a closed queueing network consisting only of the subsystem with simultaneous resource possession, where queues can have service rates that are a function of the utilization of all the queues (number of busy servers). The submodel is solved using a newly discovered product form solution. Results are compared with simulation models and other available analytic techniques. GRA

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N83-27638# National Research Inst. for Mathematical Sciences, Pretoria (South Africa).
A CATEGORIZED THEORY OF BILINEAR SYSTEMS OVER A RING [N KATEGORIEELE TEORIE VAN BILINEERE STELSELS OOR RINGE]
C. G. Nolte Jun. 1982 110 p refs In AFRIKAANS; ENGLISH summary
(CSIR-TWISK-264) Avail: NTIS HC A06/MF A01

The generalization of the results obtained for linear systems over a field or ring to a certain class of nonlinear systems, the bilinear systems, is outlined. The theory of these systems are investigated. Necessary and sufficient rank conditions for reachability and observability of a system in a category are obtained by extending the dimension concept in vector spaces. These rank conditions are used to obtain necessary condition for the reachability and observability of linear as well as bilinear systems over a ring. A categorical description of the Hankel matrix of a bilinear system over a ring is given and compared with the Hankel matrix for bilinear systems over the real numbers, which was obtained by using matrix manipulations. A general duality theory for adjoint systems in a category is developed and applied to bilinear systems. Morita duality is used in the characterization of the class of rings for which the duality between reachability and observability holds. The results are extended to time varying systems in a category. E.A.K.

N83-27639# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.

AN EMPIRICAL STUDY OF INSERTION AND DELETION IN BINARY SEARCH TREES Interim Report

Jeffrey L. Eppinger 2 Dec. 1982 20 p
(Contract N00014-76-C-0370)
(AD-A125210; CMU-CS-82-146) Avail: NTIS HC A02/MF A01 CSCL 12/1

This paper describes an experiment on the effect of insertions and deletions on the path length of unbalanced binary search trees. Given a random binary tree, repeatedly inserting and deleting nodes yields a tree that is no longer random. The expected internal path length differs when different deletion algorithms are used. Previous empirical studies indicated that expected internal path length tends to decrease after repeated insertions and asymmetric deletion. This study shows that performing a larger number of insertions and asymmetric deletion actually increases the expected internal path length, and that for sufficiently large trees, the expected internal path length becomes worse than that of a random tree. However, with a symmetric deletion algorithm, the results indicate that performing a large number of insertions and deletions decreases the expected internal path length, and that the expected internal path length remains better than that of a random tree. Author (GRA)

N83-27640# Maryland Univ., College Park. Computer Vision Lab.

MOTION ESTIMATION BASED ON MULTIPLE LOCAL CONSTRAINTS AND NONLINEAR SMOOTHING

Kwangyoen Wohn, Larry S. Davis, and Philip Thrift Aug. 1982 24 p refs
(Contract DAAG53-76-C-0138; DARPA Order 3206)
(AD-A124838; TR-1188) Avail: NTIS HC A02/MF A01 CSCL 12/1

A new algorithm for estimating motion from image sequences is presented. Initial motion estimates are determined based on a least-squares solution to a set of independent linear constraints on the motion at a pixel. These initial estimates are then improved by a nonlinear smoothing operation. The results of this algorithm are compared with those obtained by the Horn-Schunck algorithm on a number of image sequences. Author (GRA)

N83-27641# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

MULTIPLE MODEL ADAPTIVE ESTIMATION FOR SPACE-TIME POINT PROCESS OBSERVATIONS Ph.D. Thesis

David E. Meer Aug. 1982 248 p refs
(AD-A124827; AFIT/DS/EE/82-2) Avail: NTIS HC A11/MF A01 CSCL 12/1

The problem addressed by this research is one of estimating parameters of an underlying stochastic process from observations of a point process where the point process is dependent on the underlying process and the observations are corrupted by point process noise. A second, closely related problem is that of allowing feedback control for a system in which observations of a point process signal are corrupted by point process noise. This will provide a method for investigating the optimal stochastic adaptive controller for the system. The major contribution of this research is a method for developing an estimator for the above mentioned point process signal in point process noise environment. The method allows feedback to the model from the observations thus providing a means for control. This method is used to develop the estimator for the neutral particle beam pointing and tracking problem which motivated this research. Author (GRA)

N83-27642# Jet Propulsion Lab., California Inst. of Tech., Pasadena.

NUMERICAL DYNAMIC ANALYSIS OF STRUCTURES BY THE FINITE DYNAMIC ELEMENT METHOD Final Report, 1 Feb. 1980 - 15 Aug. 1982

Kajal K. Gupta 15 Aug. 1982 68 p refs
(Grant AF-AFOSR-0169-80; AF Proj. 2304)
(AD-A125213; AFOSR-82-1095TR) Avail: NTIS HC A04/MF A01 CSCL 12/1

This report describes progress made in research during the final year of a five-year study of numerical dynamical analysis of structures funded by an AFOSR Grant. The original proposal was JPL Proposal 51-641 dated 6-29-76, and the final year renewal was proposed on 12-18-80. The proposed work effort in the final year's work included the following Tasks: (1) development of a higher order rectangular plane stress/strain finite element, (2) development of a solid hexahedron finite dynamic element, (3) further refinement of the Associated Generalized Eigenproblem Solution Routine. Author (GRA)

N83-27643# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.

PROBLEM SOLVING TECHNIQUES FOR THE DESIGN OF ALGORITHMS

Elaine Kant and Allen Newell 23 Nov. 1982 36 p refs
(Contract F33615-81-K-1539; ARPA Order 3597)
(AD-A125211; CMU-CS-82-145) Avail: NTIS HC A03/MF A01 CSCL 05/10

By studying the problem-solving techniques that people use to design algorithms we can learn something about building systems that automatically derive algorithms or assist human designers. In this paper we present a model of algorithm design based on our analysis of the protocols of two subjects designing three convex hull algorithms. The subjects work mainly in a data-flow problem space in which the objects are representations of partially specified algorithms. A small number of general-purpose operators construct and modify the representations; these operators are adapted to the current problem state by means-ends analysis. The problem space also includes knowledge-rich schemes such as divide and conquer that subjects incorporate into their algorithms. A particularly versatile problem-solving method in this problem space is symbolic execution, which can be used to refine, verify, or explain components of an algorithm. The subjects also work in a task-domain space about geometry. The interplay between problem solving in the two spaces makes possible the processes of discovery. We have observed that the time a subject tasks to design an algorithm is proportional to the number of components in the algorithm's data-flow representation. Finally, the details of the problem spaces provide a model for building a robust automated system.
Author (GRA)

N83-27644# Wisconsin Univ., Madison. Mathematics Research Center.

AN ASYMPTOTICALLY ORTHONORMAL POLYNOMIAL FAMILY Technical Summary Report

Lothar Reichel Dec. 1982 16 p refs
(Contract DAAG29-80-C-0041)
(AD-A125268; MRC-TSR-2460) Avail: NTIS HC A02/MF A01 CSCL 12/1

Given a Jordan curve T in the complex plane, we describe a polynomial family which is asymptotically orthonormal on T. The polynomials have some similarities with the Faber polynomials but are simpler to compute with. Numerical examples are presented.
Author (GRA)

N83-27645# Wisconsin Univ., Madison. Mathematics Research Center.

SOME REMARKS ON THE CONTINUATION METHOD OF LERAY-SCHAUDER-RABINOWITZ AND THE METHOD OF MONOTONE ITERATIONS Technical Summary Report

Philippe Clement Dec. 1982 18 p refs
(Contract DAAG29-80-C-0041)
(AD-A125267; MRC-TSR-2454) Avail: NTIS HC A02/MF A01 CSCL 12/1

Certain physical phenomena can be modelled by the nonlinear eigenvalue problem (P). Under minimal assumptions on the nonlinear term, which may be of interest in some applications, the existence of solutions can be obtained by several known methods. The purpose of this paper is to compare two such methods, namely the continuation method due to Leray and

Schauder as extended by Rabinowitz, and the method of monotone iterations. Our results are then applied to problem (P). GRA

N83-27646# Rhode Island Univ., Kingston. Dept. of Electrical Engineering.
A PRONY METHODY FOR NOISY DATA: CHOOSING THE SIGNAL COMPONENTS AND SELECTING THE ORDER IN EXPONENTIAL SIGNAL MODELS Report, Apr. - Sep. 1982
Ramdas Kumaresan, Donald W. Tufts, and Lous I. Scharf Dec. 1982 17 p refs
(Contracts N00014-81-K-0144; N00014-82-K-0300)
(AD-A124897; R-3) Avail: NTIS HC A02/MF A01 CSCL 12/1

Prony's method is simple procedure for determining the value of parameters of a linear combination of exponential functions. Until recently, even the modern variants of this method have performed poorly in the presence of noise. We propose a simple procedure for estimation of the signal parameters in the presence of noise. This procedure is very close in form and assumptions to Prony's method. However, in preliminary tests, the performance of the method is close to that of the best available, more complicated, approaches which are based on maximum likelihood or on the use of eigenvector or singular vector decompositions. Author (GRA)

N83-27647# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A COMPARISON OF THE FINITE BEAT CONDUCTION EQUATION WITH TEMPERATURE DEPENDENT CONDUCTIVITY M.S. Thesis
Michael J. Sabochick Aug. 1982 63 p refs
(AD-A124918; AFIT/GNE/PH/83M-1) Avail: NTIS HC A04/MF A01 CSCL 12/1

The transient heat conduction equation with a nonlinear conductivity is solved using three finite difference schemes and two finite element schemes. The schemes are compared for speed and accuracy against an analytic solution. The finite element methods are shown to be the most accurate and one, a lumped mass method, is comparable in speed to the finite difference methods. The lumped mass finite element method is shown to be the clear choice from among the methods tested in solving the test problem. Author (GRA)

N83-27648# Minnesota Univ., Minneapolis. Dept. of Computer Science.
ANOMALIES IN PARALLEL BRANCH-AND-BOUND ALGORITHMS
Ten-Hwang Lai and Sartaj Sahni Dec. 1982 24 p refs
(Contract N00014-80-C-0650)
(AD-A125290; TR-82-25) Avail: NTIS HC A02/MF A01 CSCL 12/1

Branch-and-bound is a popular algorithm design technique that has been successfully used in the solution of problems that arise in various fields (e.g., combinatorial optimization, artificial intelligence, etc.) The authors briefly describe the branch-and-bound method as used in the solution of combinatorial optimization problems. They consider the effects of parallelizing branch-and-bound algorithms by expanding several live nodes simultaneously. It is shown that it is quite possible for a parallel branch-and-bound algorithm using n sub 2 processors to take more time than using n sub 1 processors even though n sub 1 $<$ n sub 2. Furthermore, it is also possible to achieve speedups that are in excess of the ratio n sub 2/n sub 1. Experimental results with the 0/1 Knapsack and Traveling Salesperson problems are also presented. GRA

N83-27649# Wisconsin Univ., Madison. Mathematics Research Center.
LAX-WENDROFF METHODS FOR HYPERBOLIC HISTORY VALUE PROBLEMS Technical Summary Report
Peter Markowich and Michael Renardy Dec. 1982 61 p refs
(Contract DAAG29-80-C-0041)
(AD-A125283; MRC-TSR-2462) Avail: NTIS HC A04/MF A01 CSCL 12/1

The motion of viscoelastic materials can be modelled by partial integrodifferential equations. For several model problems, recent investigations have been concerned with the question whether or not these equations allow the development of shocks. This paper is concerned with Lax-Wendroff methods for a class of hyperbolic history value problems. These problems have the feature that globally (in time) smooth solutions exist if the data are sufficiently small and that solutions develop singularities for large data. The authors prove (second order) convergence of the Lax-Wendroff method for smooth solutions and investigate numerically the dependence on the initial data. They demonstrate the occurrence of shock type singularities and compare the results to the quasilinear wave equation (without Volterra term). GRA

N83-27650# Pittsburgh Univ., Pa. Center for Multivariate Analysis.
EXISTENCE OF UNBIASED COVARIANCE COMPONENTS ESTIMATORS
Jochen Mueller Nov. 1982 11 p refs
(Contract F49620-82-K-0001; AF Proj. 2304)
(AD-A125299; TR-82-37; AFOSR-83-0006TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

In 1970 Seely derived a condition for the estimability of covariance components by a quadratic form in a general covariance component model. For normally distributed variables Pincus (1974) investigated the existence of arbitrary unbiased estimators and obtained the same characterization as Seely. In his paper Pincus assumed the parameter space has a nonempty interior consisting of regular covariance matrices. Later there was a controversy whether Pincus' result remains valid for singular covariance matrices. As a matter of fact, one can dispense with the regularity but not with the nonempty interior. The latter condition, however, can be fairly weakened. As for invariant estimation one can even replace the assumption of normality by a weaker one. This is analogous to Theorem 2 of H. Bunke and O. Bunke (1974), which concerns estimability of the mean value. The authors of this document verify our result along the same lines as Pincus did in his original paper. But now a coordinate free presentation reduces the proof to its essential moments and in this way permits also singular covariance matrices. The crucial point turns out to be the completeness of the (locally) best linear unbiased estimator of the expectation. GRA

N83-27651# Naval Postgraduate School, Monterey, Calif.
PROBABILISTIC DESIGN USING NUMERICAL OPTIMIZATION M.S. Thesis
James Harris Hopper, III Oct. 1982 100 p refs
(AD-A125232) Avail: NTIS HC A05/MF A01 CSCL 12/1

A FORTRAN program has been developed to allow for the use of probabilistic design methods in the numerical optimization process. The program was written as a set of subroutines for COPES (Control Program For Engineering Synthesis). COPES maximizes or minimizes a numerically defined objective function subject to a set of inequality constraints using the optimization program CONMIN (A FORTRAN Program for Constrained Function Minimization). The program developed here allows for the use of both the normal and lognormal distribution models. Design examples are presented to demonstrate the program capabilities. User instructions are provided for inclusion in the COPES user's manual. Author (GRA)

N83-27652# California Univ., Berkeley. Operations Research Center.
IDENTIFIABILTY AND ESTIMATION IN RANDOM TRANSLATIONS OF MARKED POINT PROCESSES
Maria F. Ramalhoto Oct. 1982 36 p refs
(Grant AF-AFOSR-0122-81; AF Proj. 2304)
(AD-A125313; ORC-82-13) Avail: NTIS HC A03/MF A01 CSCL 12/1

A random translation of a marked point process is considered. The random translation is assumed to be dependent upon the mark through a certain function. The main concern is to study the form of the function for different types of data. Complete identifica-

tion is not generally possible but some interesting particular solutions are presented. GRA

N83-27653# Wisconsin Univ., Madison. Mathematics Research Center.
A CLASS OF BIHARMONIC END-STRIPING PROBLEMS ARISING IN ELASTICITY AND STOKES FLOW Technical Summary Report
D. A. Spence Nov. 1982 56 p refs
(Contract DAAG29-80-C-0041)
(AD-A125305; MRC-TSR-2449) Avail: NTIS HC A04/MF A01 CSCL 12/1

We consider boundary value problems for the biharmonic equation in the open rectangle $x > 0$, $-1 < y < 1$, with homogeneous boundary conditions on the free edges $y = +$ or -1, and data on the end $x = 0$ of a type arising both in elasticity and in Stokes flow of a viscous fluid, in which either two stresses or two displacements are prescribed. For such 'non-canonical' data, coefficients in the eigenfunction expansion can be found only from the solution of infinite sets of linear equations, for which a variety of methods of formulation have been proposed. A drawback of existing methods has been that the resulting equations are unstable with respect to the order of truncation. It is clear from an examination of the spectrum of a typical matrix that ill-conditioning is to be expected. However, a search among a wider class of possible trial functions than hitherto for use in a Galerkin method based on the actual eigenfunctions has led to the choice of a unique set, here termed optimal weighting functions, for which the resulting infinite matrix is diagonally-dominated. This ensures the existence of an inverse, which can be approximated by solving a finite subset of the equations. GRA

N83-27654# Wisconsin Univ., Madison. Mathematics Research Center.
LARGE AMPLITUDE TIME PERIODIC SOLUTIONS OF A SEMILINEAR WAVE EQUATION Technical Summary Report
Paul H. Rabinowitz Dec. 1982 27 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-81-10556)
(AD-A125257; MRC-TSR-2458) Avail: NTIS HC A03/MF A01 CSCL 12/1

This paper studies the existence of periodic solutions for a family of semilinear wave equations where the restoring force is independent of time, monotone, and grows at a more rapid rate than linear near infinity. With appropriate technical assumptions it is shown that there is an unbounded sequence of such free vibrations, i.e., there are solutions of arbitrarily large amplitude. If the restoring force is independent of x, the monotonicity assumption can be omitted. GRA

N83-27655# Wisconsin Univ., Madison. Mathematics Research Center.
DIFFERENTIATION AND GENERATION OF TAYLOR COEFFICIENTS IN PASCAL-SC Technical Summary Report
L. B. Rall Dec. 1982 23 p refs
(Contract DAAG29-80-C-0041)
(AD-A125246; MRC-TSR-2452) Avail: NTIS HC A02/MF A01 CSCL 12/1

Evaluation of derivatives and Taylor coefficients of functions defined by computer programs has many applications in scientific computation. The process of automatic differentiation of such functions has as its goal the production of machine code for the evaluation of derivatives and Taylor coefficients. This is in contrast to symbolic differentiation, where the desired output is a more or less pretty formula, and numerical differentiation, which is inaccurate and unstable. Another distinction between automatic and symbolic differentiation is that the latter usually involves considerable computational overhead, while automatic differentiation can be carried out at compile time by a compiler which permits user-defined data types and operators. This report shows how PASCAL-SC, a compiler of this type, can be used to generate the real derivative types GRADIENT, HESSIAN, TAYLOR, and the corresponding interval types IGRADIENT, IHESSIAN, ITAYLOR. Applications of these types to solution of systems of nonlinear equations, sensitivity analysis, constrained and unconstrained optimization, and the solution of initial-value problems for systems of ordinary differential equations are indicated. GRA

N83-27656# Wisconsin Univ., Madison. Mathematics Research Center.
LINEAR PARABOLIC EQUATIONS WITH A SINGULAR LOWER ORDER COEFFICIENT Technical Summary Report
Klaus Hoellig Nov. 1982 34 p
(Contract DAAG29-80-C-0041; Grant NSF MCS-79-27062)
(AD-A125245; MRC-TSR-2453) Avail: NTIS HC A03/MF A01 CSCL 12/1

This report was motivated by the study of free boundary value problems related to the Stefan problem. The precise description of the smoothness of the free boundary requires sharp regularity results for linear parabolic equations with singular coefficients. These results are of independent interest. They can be applied to parabolic equations on domains with curved boundaries that tough the x-axis. As a particular example consider the heat equation; this example arises in the convexity of the nonlinear parabolic problem. GRA

N83-27657# Wisconsin Univ., Madison. Mathematics Research Center.
LOCAL STRUCTURE OF FEASIBLE SETS IN NONLINEAR PROGRAMMING. PART 1: REGULARITY Technical Summary Report
Stephen M. Robinson Dec. 1982 19 p refs
(Contract DAAG29-80-C-0041; Grants NSF MCS-79-01066; NSF MCS-82-00632)
(AD-A125244; MRC-TSR-2459-Pt-1) Avail: NTIS HC A02/MF A01 CSCL 12/1

Nonlinear programming is concerned with the problem of minimizing a function, often fairly smooth, over a set (the so-called feasible set) described by nonlinear inequality and equality constraints, as well as perhaps some bounds or other restrictions on the variables. Problems of nonlinear programming arise in statistics, in chemical engineering, in economics, and in many other areas. Certain basic conditions, called optimality conditions, must be satisfied by any candidate for a solution of such a problem, provided that the constraints satisfy a reasonable regularity condition. These conditions describe the relationship of the derivatives of the function being minimized to the derivatives of the constraint functions and the set over which the minimization is being done. They form the basis for most numerical algorithms for solving such problems. Given a feasible point for a nonlinear programming problem, the authors investigate the structure of the feasible set near that point. Under the constraint qualification called regularity, it is shown how to compute the tangent cone to the feasible set, and to produce feasible arcs with prescribed first and second derivatives. In order to carry out these constructions, a particular way of representing the feasible set (as a system of equations with constrained variables) is particularly useful. Also given are fairly short proofs of the first-order and second-order necessary optimality conditions in very general forms, using the arc constructions mentioned above. GRA

N83-27658# Wisconsin Univ., Madison. Mathematics Research Center.
CONDITIONAL PERMUTATION TESTS AND THE PROPENSITY SCORE IN OBSERVATIONAL STUDIES Technical Summary Report
Paul R. Rosenbaum Dec. 1982 27 p refs
(Contract DAAG29-80-C-0041; Grant PHS-P30-CA-14520)
(AD-A125241; MRC-TSR-2463) Avail: NTIS HC A03/MF A01 CSCL 12/1

In observational studies, the distribution of treatment assignments is unknown, and therefore randomization tests are not generally applicable. However, permutation tests that condition on sample information about the treatment assignment mechanism can be applicable in observational studies, providing treatment assignment is strongly ignorable. These tests use the conditional distribution of the treatment assignments given a sufficient statistic

for the unknown parameter of the propensity score. Several tests that are commonly used in observational studies are particular instances of this general procedure; moreover, conditional permutation tests and covariance adjustment are closely related. A backtrack algorithm is developed to permit efficient calculation of the exact conditional significance level, and two approximations are discussed. A clinical study of treatments for lung cancer is used to illustrate the technique. Conditional permutation tests extend previous large sample results on the propensity score by providing a general basis for exact inference in small observational studies when treatment assignment is strongly ignorable.
Author (GRA)

N83-27659# Wisconsin Univ., Madison. Mathematics Research Center.
THE STABILITY OF ONE-STEP SCHEMES FOR FIRST-ORDER TWO-POINT BOUNDARY VALUE PROBLEMS Technical Summary Report
C. DeBoor, F. DeHoog, and H. B. Keller Nov. 1982 16 p refs
(Contract DAAG29-80-C-0041)
(AD-A125240; MRC-TSR-2448) Avail: NTIS HC A02/MF A01 CSCL 12/1

The stability of a finite difference scheme is related explicitly to the stability of the continuous problem being solved. At times, this gives materially better estimates for the stability constant than those obtained by the standard process of appealing to the stability of the numerical scheme for the associated initial value problem.
GRA

N83-27660# Maryland Univ., College Park. Lab. for Numerical Analyses.
THE POST-PROCESSING APPROACH IN THE FINITE ELEMENT METHOD. PART 1: CALCULATION OF DISPLACEMENTS, STRESSES, AND OTHER HIGHER DERIVATIVES OF THE DISPLACEMENTS Final Report
I. Babuska and A. Miller Dec. 1982 39 p refs 2 Vol.
(Contract N00014-77-C-0623)
(AD-A125039; BN-992-Pt-1) Avail: NTIS HC A03/MF A01 CSCL 12/1

This is the first in a series of three papers in which the authors discuss a method for post-processing a finite element solution to obtain high accuracy approximations for displacements, stresses, stress intensity factors, etc. Rather than take the values of these quantities directly from the finite element solution, they evaluate certain weighted averages of the solution over the entire region. These yield approximations that are of the same order of accuracy as the strain energy. They obtain error estimates, and also present some numerical examples to illustrate the practical effectively of the technique. In the third paper of this series the authors address the matters of adaptive mesh selection and a'posteriori error estimation. Author (GRA)

N83-27661# Maryland Univ., College Park. Lab. for Numerical Analysis.
THE POST-PROCESSING APPROACH IN THE FINITE ELEMENT METHOD. PART 2: THE CALCULATION OF STRESS INTENSITY FACTORS Final Report
I. Babuska and A. Miller Dec. 1982 36 p refs 2 Vol.
(Contract N00014-77-C-0623)
(AD-A125040; BN-993-Pt-2) Avail: NTIS HC A03/MF A01 CSCL 12/1

In the context of a model problem the authors describe post-processing techniques for the calculation of generalized stress intensity factors. They discuss two broad classes of methods, one involving an influence function, and the other related to the well-known energy release principle of fracture mechanics. An error analysis is sketched and two numerical examples are given to illustrate the effectivity of the techniques. This is the second in a series of three papers. Author (GRA)

N83-27662# Southern Methodist Univ., Dallas, Tex. Dept. of Statistics.
ON THE RELATIONSHIP BETWEEN FUNCTIONS WITH THE SAME OPTIMAL KNOTS IN SPLINE WITH PIECEWISE POLYNOMIAL APPROXIMATION
Randall I. Eubank Oct. 1982 9 p refs
(Contract N00014-82-K-0207)
(AD-A125002; TR-67) Avail: NTIS HC A02/MF A01 CSCL 12/1

The relationship between functions with the same optimal knows for L sub 2 (0,1) approximation by k-th order splines or piecewise polynomials is investigated. It is shown that, if two functions have positive continuous k-th derivatives, they will have the same optimal knots if and only if they differ by a polynomial of order k. An application to design selection for continuous time regression is considered and extensions to L sub p approximation are also provided. Author (GRA)

N83-27663# New Mexico Univ., Albuquerque. Dept. of Electrical Engineering.
PERFORMANCE SURFACES OF ADAPTIVE PREDICTORS STRUCTURES
Delores M. Etter and Samuel D. Stearns (Sandia Labs., Albuquerque, N. Mex.) 1982 8 p Presented at a conf. Sponsored by DOE
(DE82-020090; SAND-82-1353C; CONF-821105-2) Avail: NTIS HC A02/MF A01

The performance surface of an adaptive filter is determined by the filter structure and input signal conditions, but not by the adaptive algorithm. The performance surfaces of various adaptive prediction structures, including FIR, IIR, and lattice predictors are examined and illustrated. By comparing the performance surfaces, we draw conclusions about the relative abilities of the different structures to converge and to track changing signal conditions.
DOE

N83-27664# Los Alamos Scientific Lab., N. Mex.
MAPPING METHOD FOR GENERATING THREE-DIMENSIONAL MESHES: PAST AND PRESENT
W. A. Cook and W. R. Oakes 1982 9 p refs Presented at the 2nd ASME Intern. Computer Eng. Conf., San Diego, Calif., 15-19 Aug. 1982
(Contract W-7405-eng-36)
(DE82-014077; LA-UR-82-1000; CONF-820815-1) Avail: NTIS HC A02/MF A01

Two transformations are derived in this paper. One is a mapping of a unit square onto a curve and the other is a mapping of a unit cube onto a three-dimensional region. Two meshing computer programs are then discussed that use these mappings. The first is INGEN, which has been used to calculate three-dimensional meshes for approximately 15 years. This meshing program uses an index scheme to number boundaries, surfaces, and regions. With such an index scheme, it is possible to control nodal points, elements, and boundary conditions. The second is ESCHER, a meshing program now being developed. DOE

N83-27665# Los Alamos Scientific Lab., N. Mex. Theoretical Div.
DEGENERATE PERTURBATION THEORY
Baird Brandow 1982 16 p refs Presented at the 4th Intern. Congr. in Quantum Chem., Uppsala, 14-19 Jun. 1982
(Contract W-7405-eng-36)
(DE82-019555; LA-UR-82-1961; CONF-820697-2) Avail: NTIS HC A02/MF A01

The algebraic structure of degenerate Rayleigh-Schroedinger perturbation theory is reviewed. There are a number of different but equivalent algorithms which generate this perturbation series; we argue that the frequent need to carry out infinite-order partial summations selects one of these algorithms as the most efficient. Recent developments include coupled-cluster formulations for open shells, a new diagrammatic representation, and the concept of incomplete model subspaces. These subjects are reviewed, as well as some applications. DOE

N83-27666# Wisconsin Univ., Madison. Mathematics Research Center.

ON THE NUMERICAL SOLUTION OF SOME 2-D ELECTROMAGNETIC INTERFACE PROBLEMS BY THE BOUNDARY COLLOCATION METHOD Technical Summary Report
Lothar Reichel Dec. 1982 16 p refs
(Contract DAAG29-80-C-0041)
(AD-A125269; MRC-TSR-2461) Avail: NTIS HC A02/MF A01 CSCL 12/1

The boundary collocation method is used to solve some 2-d interface problems of microwave heating. The choice of subspace of particular solutions, and the selection of collocation points are discussed. Numerical examples are presented. Author (GRA)

N83-27667# Argonne National Lab., Ill. Mathematics and Computer Science Div.
RECENT DEVELOPMENTS IN ALGORITHMS AND SOFTWARE FOR TRUST-REGION METHODS
Jorge J. More Oct. 1982 38 p refs
(Contract W-31-109-eng-38)
(DE83-006276; ANL/MCS-TM-2) Avail: NTIS HC A03/MF A01

Trust region methods are an important class of iterative methods for the solution of nonlinear optimization problems. Algorithms in this class have been proposed for the solution of systems of nonlinear equations, nonlinear estimation problems, unconstrained and constrained optimization, nondifferentiable optimization, and large scale optimization. Interest in trust region methods derives, in part, from the availability of strong convergence results and from the development of software for these methods which is reliable, efficient, and amazingly free of ad-hoc decisions. In this paper we survey the theoretical and practical results available for trust region methods and discuss the relevance of these results to the implementation of trust region methods. DOE

N83-27668# Department of Energy, Washington, D. C. Office of Basic Energy Sciences.
SUMMARIES OF THE FY 1982 APPLIED MATHEMATICAL SCIENCES RESEARCH PROGRAM
Dec. 1982 75 p
(DE83-005815; DOE/ER-0157) Avail: NTIS HC A04/MF A01

The purpose of this report is to provide a convenient compilation of summaries of the individual research projects that constitute the Applied Mathematical Sciences program in the Office of Basic Energy Sciences, Office of Energy Research, Department of Energy. The report is ordered alphabetically by institution. DOE laboratories are integrated in alphabetical order with university and other non-DOE institutional participants in the program. In sequence, each project entry begins with an underlined identification number, number, followed by the project title, the FY 1982 funds allocated, and the program component identification number: (1) Analytic and Numerical Methods; (2) Information Analysis Techniques; (3) Advanced Computing Concepts; or (4) Special Projects. DOE

N83-27669# Southern Methodist Univ., Dallas, Tex. Dept. of Statistics.
ONE-SIDED TOLERANCE LIMITS FOR BALANCED ONE-WAY ANOVA RANDOM MODEL
Robert W. Mee and D. B. Owen Nov. 1982 24 p refs
(Contract N00014-76-C-0613)
(AD-A125026; TR-168) Avail: NTIS HC A02/MF A01 CSCL 12/1

The authors investigate various techniques for determining a tolerance limit L such that the probability is gamma that at least a proportion P of a population produced in batches exceeds L. First, they evaluate the approach of Lemon for this problem and then present alternative approaches. If the variance ratio is known, one may obtain exact tolerance limits. For settings where the variance ratio is not necessarily known, they describe a procedure, based on the Satterthwaite approximation, for obtaining conservative tolerance limits. Author (GRA)

N83-27670# California Univ., Livermore. Lawrence Livermore Lab.
STOP: A FAST METHOD OF DISJOINTING BINARY PRODUCT SETS
Cherie Jo Patenaude 14 Jan. 1983 27 p refs
(Contract W-7405-eng-48)
(DE83-007463; UCID-30192) Avail: NTIS HC A03/MF A01

The STOP program uses a fast method of disjointing a collection of binary product sets. There are a number of applications where this is useful. This manual concentrates on the uses of STOP in the exact computation of the performance of complex probabilistic systems. In general, STOP is applied to the disjointing of cut sets in the evaluation of the probabilistic performance of a system. It runs under the LTSS operating system on the CRAY-1 computers at LLNL. The evaluation of system performance from the performance of the components and their interconnections proceeds in two steps. First, a performance rejection region for the system is defined and the combinations of the component states that cause system rejection are determined. These are the cut sets of the system. Next, the probability of occurrence of at least one of these cut sets is computed from the probabilities associated with the components of the cut sets. Disjoint sets are desirable for an accurate and exact probability analysis. The STOP method represents a set theoretic viewpoint where system success or failure is represented as a union of intersections of dependent events, and a disjoint representation for that union is sought. Although this representation is analagous to a sum of product form in a Boolean problem, the set theoretic view provides considerably more insight into the structure of the computational problem, particularly since a holistic approach is taken where all cut sets are examined and transformed simultaneously using a divide and conquer approach to obtain the disjoint form. DOE

N83-27671# Carnegie-Mellon Univ., Pittsburgh, Pa. Management Sciences Research Group.
SUBMODULAR SET FUNCTIONS, AMTROIDS AND THE GREEDY ALGORITHM: TIGHT WORST-CAST BOUNDS AND SOME GENERALIZATIONS OF THE RADO-EDMONDS THEOREM
Michele Conforti and Gerard Cornuejols Jan. 1983 38 p refs
(Contract N00014-79-C-0340; Grant NSF ECS-82-05425)
(AD-A124981; MSRR-487) Avail: NTIS HC A03/MF A01 CSCL 12/1

A solution with value at least 1/(1 + alpha) times the optimum value, where alpha is a parameter which represents the total curvature of Z is discussed. Another bound which generalizes the Radio-Edmonds theorem is given in terms of a greedy curvature of the set function. Unlike the first bound, this bound can prove the optimality of the greedy algorithm even in instances where Z is not additive. A third bound, in terms of the rank and the girth of X, unifies and generalizes the bounds (e-1)/e known for uniform matroids and 1/2 for general matroids. The performance of the greedy algorithm when X is an independence system instead of a matroid is analyzed. Author

N83-27672# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
THE LUMPED MASS FINITE ELEMENT METHOD FOR A PARABOLIC PROBLEM
Chen Chuan-miao (Xiangtan Univ., China) and Vidar Thomee 1983 36 p refs
(CTH-Math-1983-1) Avail: NTIS HC A03/MF A01

For a heat equation in two space dimensions, semidiscrete and totally discrete variants of the lumped mass modification of the standard Galerkin method are considered. Piecewise linear approximating functions are used. Error estimates of optimal order in L sub two and of almost optimal order in L sub infinity are demonstrated. Author (ESA)

N83-27673# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
EXTENSION OF INTERPOLATION THEOREMS FOR WEIGHTED SOBOLEV SPACES
Joergen Loefstroem 1983 25 p refs
(CTH-Math-1983-2) Avail: NTIS HC A02/MF A01

The possibility of extending interpolation results for potential

spaces and Besov spaces based on L sub p spaces with a specific weight function v, to similar results for more general weight functions u which can be written in the form v.w where w is polynomially regular is demonstrated. The generalizations are proved and the best approximation by entire functions of exponential time is discussed. Author (ESA)

N83-27674# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
FINITE ELEMENT METHODS FOR LINEAR HYBERBOLIC PROBLEMS
Claes Johnson, Uno Naevert (Saab-Scania, Linkoeping, Sweden), and Juhani Pitkaeranta (Helsinki Univ., Espoo) 1983 44 p refs Submitted for publication
(CTH-Math-1983-4) Avail: NTIS HC A03/MF A01

Finite element methods for convection-diffusion problems and first order linear hyperbolic problems are surveyed. The streamline diffusion method for a stationary convection-diffusion problem, the discontinuous Galerkin method, the streamline diffusion method for a time-dependent convection-diffusion problem, and the Friedrichs systems are discussed. Author (ESA)

N83-27675# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
PERIODIC RENEWAL THEORY
Hermann Thorisson 1983 29 p refs
(CTH-Math-1983-5; ISSN-0347-2809) Avail: NTIS HC A03/MF A01

Stochastic processes (Z) on a general state space having a certain periodic regeneration property are considered. There is an increasing sequence of random times such that for each time S sub n the subsequent time differences and associated processes are conditionally independent of previous times, and the conditional distribution does not depend on n. The assumed condition is that the distributions have a common component that is an absolute continuous Lebesgue measure. It is proved that Z can be viewed as a time-homogeneous regenerative process with regeneration times forming an aperiodic discrete renewal process. This yields tendency to forget initial conditions as time passes (weak ergodicity). The existence of an equilibrium delay distribution for S is discussed. A key periodic renewal theorem is derived and applications to population growth in periodically varying environment are examined. Author (ESA)

N83-27676# Ecole Nationale Superieure des Telecommunications, Paris (France). Dept. Systemes et Communications.
UNSTEADY MODELS, VECTORIAL AUTOREGRESSIVE MODELS, AND LEVINSON'S ALGORITHM [MODELES AUTOREGRESSIFS NON STATIONNAIRES, MODELES AUTOREGRESSIFS VECTORIELS ET ALGORITHME DE LEVINSON]
Yves Grenier 1982 46 p refs In FRENCH
(ENST-D-82005) Avail: NTIS HC A03/MF A01

The algorithm used for the identification of unsteady autoregressive models is discussed and its transcription in FORTRAN programs is described. These models are presented as a steady linear regression of the signal to be modeled with a vectorial system obtained by projecting the signal on the base (group of functions which characterize the unsteady parameter evolution). The resulting intercorrelation matrix is the product of two Toeplitz matrices per bloc and the corresponding algorithm is of the Levinson's algorithm class. The model equations, the construction of the algorithm, and the time sequences of the computing process are detailed. A set of subroutines in FORTRAN covering model variants is presented. Author (ESA)

N83-27677# Rolls-Royce Ltd., Derby (England).
EVALUATION OF THE DETECTION CAPACITY OF METHODS OF MONITORING DATA RELIABILITY
V. I. Fomin 13 Jul. 1982 12 p refs Transl. into ENGLISH of Leningrad Inst. of Precision Mech. and Opt. Izv. Vyssh. Ucheb. Zaved Proborostroen (USSR), v. 22, 1979 p 51-58
(PNR-90160; Trans-15858/TLT-00842) Avail: NTIS HC A02/MF A01

The use of the reduction coefficient Kr for evaluating the use of data monitoring methods data input, transmission, recording, storage and processing is proposed. Formulas for calculating Kr with different monitoring system configurations are introduced. The method is suitable for monitoring efficacy of technical equipment for automatic control systems. The detection capacity of individual and complex monitoring methods for different stages and groups of stages in data transformation can be determined. The influence of measures unconnected with the monitoring system on individual aspects can be ascertained. Three systems for monitoring operator-induced effects are compared using Kr.
Author (ESA)

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N83-27678# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A MODIFIED KOLMOGOROV-SMIRNOV, ANDERSON-DARLING, AND CRAMER-VON MISES TEST FOR THE GAMMA DISTRIBUTION WITH UNKNOWN LOCATION AND SCALE PARAMETERS M.S. Thesis
Philip John Viviano Dec. 1982 187 p refs
(AD-A124841; AFIT/GOR/MA/82D-4) Avail: NTIS HC A09/MF A01 CSCL 12/1

Goodness-of-fit tests are developed for the gamma distribution when the scale and location parameters are unspecified and must be estimated from the sample data. The Anderson-Darling, Cramer-von Mises, and the Kolmogorov-Smirnov statistics are used to develop a new test of fit for the three-parameter gamma distribution with unknown shape and location parameters. The critical values generated were obtained by a Monte Carlo procedure. For each value of n (sample size), 5000 sample sets were drawn from a gamma population whose shape is specified. The location and scale parameters are estimated from the data, and the three statistics are calculated based on the estimated distribution. The simulation was preformed for sample sizes n = 5, 10, 15...30 and shape parameters, K = .5, 1.0, 1.5...4.0. Using gamma distributions for shape equal to 1.5 and 4.0, the power of each test is investigated against the alternative distributions for sample sizes n = 5, 15, and 30. In general both the Anderson-Darling and the Cramer-von Mises tests are more powerful than the Kolmogorov-Smirnov test. Except for the case where the alternative distribution is lognormal, the Cramer-von Mises test is the most powerful test. The functional relationship between the critical values of the Anderson-Darling, Cramer-von Mises, and Kolmogorov-Smirnov is also examined. A critical value for a shape parameter between 1.5 and 4.0 which is not included in the tables can then be easily derived from this functional relationship. GRA

N83-27679*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
AN EFFICIENT ALGORITHM FOR GENERATING RANDOM NUMBER PAIRS DRAWN FROM A BIVARIATE NORMAL DISTRIBUTION
C. Warren Campbell Jun. 1983 17 p refs
(NASA-TP-2173; NAS 1.60:2173) Avail: NTIS HC A02/MF A01 CSCL 12A

An efficient algorithm for generating random number pairs from a bivariate normal distribution was developed. Any desired value of the two means, two standard deviations, and correlation coefficient can be selected. Theoretically the technique is exact and in practice its accuracy is limited only by the quality of the uniform distribution random number generator, inaccuracies in computer function evaluation, and arithmetic. A FORTRAN routine was written to check the algorithm and good accuracy was obtained. Some small errors in the correlation coefficient were observed to vary in a surprisingly regular manner. A simple model

was developed which explained the qualities aspects of the errors. Author

N83-27680# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

A NEW GOODNESS OF FIT TEST FOR THE UNIFORM DISTRIBUTION WITH UNSPECIFIED PARAMETERS M.S. Thesis

Larry B. Woodbury Dec. 1982 101 p refs

(AD-A124835; AFIT/GOR-MA-82D-6) Avail: NTIS HC A06/MF A01 CSCL 12/1

Separate techniques of interpolation, reflection, and parameter estimation are combined to develop a new goodness of fit test for the uniform distribution. The Kolmogorov-Smirnov, Anderson-Darling, and Cramer-Von Mises statistics are used in the generation of critical value tables of sample sizes from 3 to 50. The methods for estimating parameters are the Maximum Likelihood and the Best Linear Unbiased Estimators. Separate tables for each are presented. These tables are built with and without employing the reflection technique. The reflection technique is one in which the data points are reflected about the sample mean to double the size of the sample set. With these tables of critical values, a power study is done to test the power of the three statistics with the reflection procedure versus the same statistics without the reflection procedure. GRA

N83-27681# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

A STUDY OF MULTIVARIATE STATISTICAL ANALYSIS TECHNIQUES FOR COMPUTER PERFORMANCE EVALUATION M.S. Thesis

Gregory Magavero Dec. 1982 128 p refs

(AD-A124899; AFIT/GCS/EE/82D-23) Avail: NTIS HC A07/MF A01 CSCL 12/1

Computer performance analysts have relied too much on the use of linear regression analysis because of a lack of other data analysis techniques. Now, however, there are a number of easily available multivariate statistical techniques that need to be tested for applicability to Computer Performance Evaluation (CPE). This thesis presents some examples of how these techniques might be applied in this area, as well as some conclusions on their usefulness and applicability. Ridge Regression appeared to be useful when the independent variables were multicollinear and an explanatory model was desired. Automatic Interaction Detection was helpful in detecting the structure of data, as was Cluster Analysis. Canonical Correlation Analysis was capable of reducing the dimensionality of data while relating two sets of variables, but was considered only somewhat applicable to CPE. Factor Analysis is similar in that it can also reduce the dimensionality of data by combining variables into common factors. Both techniques work best when the variables are multicollinear. Factor analysis was also judged to be of limited applicability to CPE. Discriminant Analysis seemed to generally be non-applicable to CPE because it was designed to work with nominally scaled data and CPE data tends to be intervally scaled. Author (GRA)

N83-27682# Illinois Univ., Chicago. Dept. of Quantitative Methods.

DEVELOPMENT OF PROCEDURES AND ALGORITHMS FOR PATTERN RECOGNITION AND IMAGE PROCESSING BASED ON TWO-DIMENSIONAL MARKOV MODELS Final Report, 1 Apr. 1980 - 31 Dec. 1982

15 Feb. 1983 15 p refs

(Contract N00014-80-C-0408)

(AD-A124917; UIC/DQM/N82-8) Avail: NTIS HC A02/MF A01 CSCL 12/1

This report summarizes the major research work accomplished under the contract, including the topics of cluster analysis, time-series segmentation, image segmentation, and related software development. A list of technical reports written under the project is given. A list of programs in a software package developed under the project is also given. Author (GRA)

N83-27683# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.

OPTIMAL SMOOTHING AND ESTIMATION FOR HYBRID STATE PROCESSES

F. Bruneau and R. R. Tenney Jan. 1983 43 p refs

(Contract N00014-77-C-0532)

(AD-A124907; LIDS-P-1269) Avail: NTIS HC A03/MF A01 CSCL 12/1

Document considers the estimation and smoothing problem for a hierarchical Markov process. The supremal state evolves autonomously; infemal dynamics and observations may be statistically dependent on the supremal state. This class of processes has more structure than a general Markov process; the implications of this structure are developed here. Of special interest is the case of hybrid systems, where the supremal state is discrete and the infemal dynamics are linear and Gaussian. This structure commonly appears in diverse applications, including failure detection, maneuvering target tracking, and digital communications on analog channels. It is also the structure for which the most useful conclusions can be drawn. Author (GRA)

N83-27684# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.

OPTIMAL DECENTRALIZED CONTROL OF FINITE NONDETERMINISTIC SYSTEMS

Robert R. Tenney Oct. 1983 65 p refs

(Contract N00014-77-C-0352)

(AD-A124940; LIDS-P-1268) Avail: NTIS HC A04/MF A01 CSCL 12/1

A control problem with a system modeled as a nondeterministic finite state machine is considered. Several agents seek to optimize the behavior of the system under a minimax criterion, with each agent having different information about the system state. The nondeterministic model of uncertainty, combined with the minimax criterion, lead to equivalence relations on the past input/output histories of each agent which generate rather simple sufficient statistics for the optimal control laws. This sheds light on the basic nature of decentralized control and permits complete solution of a particular class of problems. Author (GRA)

N83-27685# Wisconsin Univ., Madison. Mathematics Research Center.

SENSITIVITY OF BAYES INFERENCE WITH IGNORABLE BUT DATA-DEPENDENT STOPPING RULES Technical Summary Report

Paul R. Rosenbaum and Donald B. Rubin Dec. 1982 16 p refs

(Contract DAAG29-80-C-0041; Grant PHS-P30-CA-14520)

(AD-A125306; MRC-TSR-2455) Avail: NTIS HC A02/MF A01 CSCL 12/1

It is sometimes argued that Bayesian inference is unaffected by data dependent stopping rules. Although this is formally true for ignorable rules, there is likely to be heightened sensitivity of inference to prior assumptions when using data dependent rules rather than stopping rules that do not depend on the data. This point is illustrated in a simple example. Author (GRA)

N83-27686# Florida Univ., Gainesville. Dept. of Industrial and Systems Engineering.

ACCEPTANCE CONTROL CHARTS BASED ON THE EXACT AND NORMAL APPROXIMATIONS TO THE BINOMIAL DISTRIBUTIONS

Carlos Amado, Richard S. Leavenworth, and Richard L. Scheaffer Dec. 1982 53 p refs

(Contract N00014-75-C-0783; NR Proj. 347-122)

(AD-A124964; RR-82-6) Avail: NTIS HC A04/MF A01 CSCL 12/1

Procedures are developed for finding the sample size and control limit for Acceptance Control Charts for proportion of nonconforming units using the exact binomial distribution, the standard normal approximation to the binomial, and a normalized arcsin transformation of the data. The user must select an Acceptable Process Level and a Rejectable Process Level and the associated risks for each. The approximation methods are

compared to the exact method over a wide range of design specifications. It was found that the arcsin transformation is considerably more accurate than the standard normal approximation and, although more complex to figure, is preferable if the user is familiar with small scientific pocket calculators. If a microprocessor or minicomputer is available, the exact binomial may be used with ease to achieve at least the stipulated risk protection desired. FORTRAN programs for the three formulations are included. Author (GRA)

N83-27687# Southern Methodist Univ., Dallas, Tex.
A SIMPLE APPROXIMATION FOR BIVARIATE NORMAL PROBABILITIES
Robert W. Mee and D. B. Owen Dec. 1982 12 p refs
(Contract N00014-76-C-0613)
(AD-A125033; TR-169) Avail: NTIS HC A02/MF A01 CSCL 12/1

The bivariate normal distribution function may be expressed as the product of a marginal normal distribution times a conditional distribution. By approximating this conditional distribution, we obtain a simple method for approximating bivariate normal probabilities. When the correlation falls in the interval (-5, .5), the maximum absolute error in our approximation is always less than .0008. The conditional distribution that we approximate is referred to as a 'normal conditioned on a truncated normal' distribution and is related to screening and selection problems. Author (GRA)

N83-27688# Los Alamos Scientific Lab., N. Mex.
PREDICTING LOW-PROBABILITY/HIGH-CONSEQUENCE EVENTS
M. C. Bryson 1982 38 p refs Presented at Workshop on Low-Probability/High Consequence Risk Analysis, Arlington, Va., 15 Jun. 1982
(Contract W-7405-eng-36)
(DE82-018373; LA-UR-82-1668; CONF-820656-2) Avail: NTIS HC A03/MF A01

PRAs often require quantification of the probabilities of various low-probability events, such as accident-initiating events and hardware-fault events. A two-stage Bayes/empirical Bayes data pooling procedure is presented for use in combining as many as five different types of relevant data. A Poisson model is assumed for the event in question. Empirical Bayes methods are used to determine the population variability curve, while Bayesian methods are used to specialize this curve to the specific event in question. The procedure is illustrated by an example in which we estimate the probability of failure of a hypothetical large dam based on (1) a deductive event-tree-type analysis of the probability, (2) historical US dam failure data, (3) the opinions of a committee of several dam experts, and (4) the operating history for the dam in question. A Stage-2 posterior distribution is produced which incorporates these data sources. Similar distributions are produced for various combinations of data types and used to asess the contribution of each data source. DOE

N83-27689# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
SUFFICIENT STATISTICS FOR DECENTRALIZED ESTIMATION
Robert R. Tenney Nov. 1982 41 p refs
(Contract N00014-77-C-0532)
(AD-A124941; LIDS-P-1270) Avail: NTIS HC A03/MF A01 CSCL 09/4

Decentralized estimation problems involve several agents receiving separate noisy observations of a common stochastic process, and each seeks to generate a local estimate of the state of that process. In the general case, these estimates are desired to be consistent in some way, and thus may be jointly penalized with the state via a cost functional to be minimized. In many cases, each agent need only keep track of its local conditional state probability distribution in order to general the optimal estimates. This paper examines the boundary between problems where this statistic is sufficient and those where it is not; when it is not, the additional information which must be kept appears to have additional structure as illustrated by an example. Author (GRA)

N83-27690# Rockwell International Corp., Golden, Colo.
COMPARISON OF ESTIMATORS OF BETA PARAMETERS FOR FITTING BINOMIAL DATA WITH VARYING p
B. A. Jones and B. S. Kerr 1982 10 p refs Presented at the Inst. of Math. and Statistics Ann. Meeting, Cincinnati, 16 Aug. 1982
(Contract DE-AC04-76DP-03533)
(DE83-006641; RFP-3352; CONF-820878-5) Avail: NTIS HC A02/MF A01

The four estimators compared here have advantages peculiar to each. The method of moments estimator is easily computed, and it is conceptually easy to understand the deviation. When the analysis is to be done on a calculator, these are the recommended estimations. When more computing power is available, the least square estimators are recommended. By definition, they are the best according to the minimum sum of squares criterion. If minimum sum of squares is not the most appropriate criterion because the area needing best fit has small expected frequency, then minimum Chi-squared estimators are best. DOE

N83-27691# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
EXISTENCE AND CONVERGENCE OF RANDOM SET DISTRIBUTIONS
Tommy Norberg 1983 20 p refs
(CTH-Math-1983-3) Avail: NTIS HC A02/MF A01

Necessary and sufficient conditions for convergence in distribution of random closed sets are given. This is used to prove Choquet's characterization theorem. Sufficient conditions guaranteeing that a (0,1)-valued random process defined on a class of sets has a version generated by a random set are shown. Convergence in distribution of unions of independent random sets is discussed. Author (ESA)

N83-27692# Hochschule der Bundeswehr, Neubiberg (West Germany). Forschungsschwerpunkt Simulation und optimierung Deterministischer und Stochastischer Dynamischer Systeme.
APPROXIMATION METHODS FOR THE DISTRIBUTION OF RANDOM SUMS
R. vonChossy and G. Rappl Jan. 1983 28 p refs
Avail: NTIS HC A03/MF A01

The validity of the central limit theorem is proved for several transformations of random sums. The Berry-Essen theorem and the Edgeworth expansion are discussed. The relative approximation error at large deviations, concerning compound Poisson distributions, is analyzed for the cases of normal approximation, Edgeworth expansion approximation and a basic Esscher approximation. Author (ESA)

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N83-27693# Sandia Labs., Albuquerque, N. Mex.
AUTOMATIC TEST GENERATION USING A MATRIX MODEL OF DIGITAL SYSTEMS
C. F. Achen 1982 12 p refs Presented at IEEE Conf. on Circuits and Computers, New York, N.Y., 29 Sep. 1982
(Contract DE-AC04-76DP-00789)
(DE82-009988; SAND-82-0893C; CONF-820908-1) Avail: NTIS HC A02/MF A01

A matrix model for digital systems, formulated at the logic gate level, is used as a framework for automatic test generation. Tests are generated through a straightforward assignment procedure which follows the basic steps of path sensitization. The procedure, analogous in many ways to the D-algorithm, will always generate a test for stuck-at-1 and stuck-at-0 faults if such a test

exists, and will identify faults for which no test can be derived. DOE

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

N83-27694# University of Northern Iowa, Cedar Falls. Dept. of Mathematics.
LIE ALGEBRAS AND FLEXIBLE LIE-ADMISSIBLE ALGEBRAS. HADRONIC PRESS MONOGRAPHS IN MATHEMATICS NUMBER 1
Hyo Chul Myung Nov. 1982 338 p
(Contract DE-AC02-80ER-10651)
(DE83-007252; DOE/ER-10651/T1-Vol-1) Avail: NTIS HC A15/MF A01

Topics covered include: nonassociative algebras; polynomial mappings; Lie algebras of characteristic O; split semisimple Lie algebras of characteristic O; representations of semisimple Lie algebras; flexible Lie admissible algebras with A(-) semisimple; and Lie admissible algebras of arbitrary characteristic. DOE

N83-27695# Argonne National Lab., Ill. Mathematics and Computer Science Div.
EIGENVALUE PROBLEM FOR HERMITIAN MATRICES WITH TIME-REVERSAL SYMMETRY
J. J. Dongarra, J. R. Gabriel, and J. H. Wilkinson Oct. 1982 19 p refs Prepared in cooperation with Stanford Univ.
(Contract W-31-109-eng-38; Grant NSF MCS-78-11985)
(DE83-005629; ANL/MCS-TM-3) Avail: NTIS HC A02/MF A01

This paper describes a computational method for dealing with a class of matrices which arise in quantum mechanics involving time reversal and inversion symmetry. The algorithms presented here have greatly reduced the computational effort required to solve this problem and also produce a stable, more accurate solution. DOE

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N83-27696# Brown Univ., Providence, R. I. Center for Dynamical Systems.
RESEARCH ON NONLINEAR DYNAMICAL SYSTEMS Final Technical Report, 1 Sep. 1976 - 24 Sep. 1982
H. T. Banks 10 Jan. 1983 19 p refs
(Contract DAAG29-79-C-0161; Grant DAAG29-76-G-0294)
(AD-A125235; ARO-13915.32-MA; ARO-16835.59-MA) Avail: NTIS HC A02/MF A01 CSCL 05/2

The principal areas of research reported are: Functional and partial differential equations and their control and estimation; Hyperbolic systems of conservation laws; Continuum physics; Stability of nonlinear evolution equations; Linear and nonlinear dynamical systems and their stability; and Bifurcation theory. This report briefly summarizes results and refers to specific publications and reports previously reported to the U.S. Army Research Office. Author (GRA)

N83-27697# Oak Ridge National Lab., Tenn.
CHARGE STATES AND DYNAMIC SCREENING OF SWIFT IONS IN SOLIDS
Jan. 1983 328 p refs Proc. of seminar held in Honolulu, Hawaii, 25-29 Jan. 1982 Sponsored in cooperation with NSF, Japan Society for the Promotion of Science and New York Univ.
(Contract W-7405-eng-26)
(DE83-006799; CONF-820131) Avail: NTIS HC A15/MF A01

This report is the proceedings of the U.S.-Japan Seminar on Charge States and Dynamic Screening of Swift Ions in Solids. Topics discussed include (1) stopping power for protons; (2) ionization effects; (3) energy loss of ions and charge state distribution. For individual titles, see N83-27698 through N83-27723.

N83-27698# Nara Women's Univ. (Japan). Dept. of Physics.
STOPPING POWERS OF Zr, Pd, Cd, In AND Pb FOR 6.5 MeV PROTONS AND MEAN EXCITATION ENERGIES **c72**
R. Ishiwari, N. Shiomi, and N. Sakamoto *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 1-12 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

Stopping powers of Zr, Pd, Cd, In and Pb have been measured for 6.5 MeV protons. Mean excitation energies have been extracted from the stopping power data by taking into account Bloch correction and cu Z(1) correction. For the shell correction the Bonderup shell correction has been used. The results agree fairly well with those of other authors. Author

N83-27699# Nara Women's Univ. (Japan). Dept. of Physics.
GEOMETRICAL EFFECT ON STOPPING POWER MEASUREMENT (ANGLE DEPENDENT ENERGY LOSS) OF 7 MeV PROTONS **c72**
R. Ishiwari, N. Shiomi, and N. Sakamoto *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 13-22 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

It was found in the previous experiment, that when extremely sharply collimated protons pass through a thin target of random matter, the energy loss of protons measured with extremely light angular resolution increases by several percent as the emergence angle increases from zero to 1.78 deg. In the present experiment, this effect has been investigated systematically by changing the target thickness for Be, Al, Cu, Ag, and Ta. B.W.

N83-27700# Nara Women's Univ. (Japan). Dept. of Physics.
COMPUTER SIMULATION OF GEOMETRICAL EFFECTS ON THE STOPPING POWER FOR 7 MeV PROTONS **c72**
N. Sakamoto, N. Shiomi, and R. Ishiwari *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 23-30 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

The angle-dependent energy loss of 7 MeV protons in metallic and organic thin foils has recently been studied. In this study it has been found that the energy loss of protons becomes large with increasing emergence angle in all targets. Since this increase of energy loss of protons has been observed in organic targets which have turned out to be perfectly amorphous, it is proved that the increase of energy loss is not due to target texture effect. The increase of energy loss could not be explained also by following three effects: (1) the increase of the target thickness caused by the deflection of protons, (2) the increase of the path length due to multiple scattering and (3) the energy transfer to recoil nuclei during multiple scattering process. Therefore the observed increase of energy loss with increasing emergence angle is concluded to be due to hitherto unknown new effect. And this effect is very likely the dependence of energy loss on the impact parameter with the atomic nucleus. B.W.

N83-27701# Montana Univ., Missoula. Dept. of Physics and Astronomy.
CURRENT STOPPING POWER ANALYSES **c72**
L. E. Porter *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 31-45 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

Modified Bethe-Bloch stopping power theory permits fairly accurate calculation of energy losses over a broad interval of projectile velocity v = beta C insofar as several parameters appearing in the revised Bethe-Bloch formula have been correctly evaluated. Since the parameters cannot in general be ascertained by calculation from first principles, fits of theory to measurement remain the best method of evaluation. B.W.

N83-27702# Waseda Univ., Tokyo (Japan). Lab. for Science and Engineering Research.
STOPPING POWER OF Ni, Ag, Au AND Pb FOR APPROXIMATELY 7 MeV/n ALPHA-PARTICLES AND CARBON IONS (Z 3/1 PROPORTIONAL DEVIATION FROM THE BETHE FORMULA) c72
Tadayoshi Doke and Tan Takahashi (Inst. for Physical and Chemical Research) *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 46-56 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

The stopping powers of several metals for approx. 7 MeV/n alpha-particles and carbon ions were measured although thus obtained data need a small correction for effective charge. In this paper, the results obtained until now are presented and the analytical results are shown. B.W.

N83-27703# National Bureau of Standards, Washington, D.C. Center for Radiation Research.
MEAN EXCITATION ENERGIES FOR USE IN BETHE'S STOPPING-POWER FORMULA c72
M. J. Berger and S. M. Seltzer *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 57-74 refs Sponsored in part by ONR (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

A review has been made of the mean excitation energies that can be derived from the analysis of stopping-power and range measurements, and from semi-empirical dipole oscillator-strength distributions for gases and dielectric-response functions for solids. On the basis of this review, mean excitation energies have been selected for 43 elemental substances and 54 compounds. Additivity rules have also been considered which allow one to estimate the mean excitation energies for compounds for which no direct data are available. These additivity rules are based on the use of mean excitation energies for atomic constituents which, to a certain extent, take into account the effects of chemical binding and physical aggregation. Author

N83-27704# Tokyo Univ. (Japan). Coll. of General Education.
INNER-SHELL IONIZATION AND STOPPING POWER c72
K. Komaki *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 75-77 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

For better understanding of various aspects in stopping phenomena such as cu Z(1) dependence, shell correction, geometrical effect, direction dependence, etc., it seems to be helpful to examine theoretically and experimentally the elementary processes which include plasmon excitation, single electron excitation and inner-shell excitation/ionization. In the present, impact-parameter dependent stopping power will be discussed in connection with inner-shell ionization. Author

N83-27705# Naval Surface Weapons Center, White Oak, Md.
PERTURBED STATIONARY-STATE DESCRIPTION OF THE POLARIZATION EFFECT IN INNERSHELL IONIZATION c72
George Basbas (Physical Review Letters) and David J. Land *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 78-87 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

A one-parameter trial initial-state wavefunction correlated to a projectile (polarized) is described and used to calculate innershell ionization cross sections for collisions with heavy charged particles. The variational principle is used to determine the parameter. The minimized energy gives the binding effect as a function of projectile position. Existing codes can be readily adapted to incorporate the trial wavefunction. Comparison with the previous theory of the polarization effect is made. Results for K-shell ionization of titanium by protons in the 0.3 - 2.4 MeV energy range agree with measured values. Author

N83-27706# International Business Machines Corp., Yorktown Heights, N. Y.
EMPIRICAL STOPPING POWERS FOR IONS IN SOLIDS c72
J. F. Ziegler, J. P. Bjersack, and U. Littmark *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 88-100 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

The work of Brandt and collaborators on low energy ion stopping powers has been extended to create an empirical formulation for the stopping of ions in solids. The result is a simple computer program (about 60 lines of code) which calculates stopping powers from zero to 100 MeV/amu for all ions in all elemental solids. This code has been compared to the data and about 2000 papers, and has a standard error of 9% for energies above 1 KeV/amu. This approach includes high energy relativistic effects and shell-corrections. In the medium energy range it uses stopping theory based on the local-density approximation and Lindhard stopping in a free electron gas. This is applied to realistic Hartree-Fock charge distributions or crystalline solids. In the low energy range it uses the Brandt concepts of ion stripping relative to the Fermi velocity of solids, and also his formalism or the relation of projectile ionization to its effective charge. The details of the calculation will be presented, and a broad comparison will be shown with experiment. Special comparative examples will be shown of both the low energy stopping power oscillations which depends on the atomic number of the ion, and also of the target. Author

N83-27707# Tokyo Univ. (Japan). Coll. of General Education.
STOPPING POWER OF RARE GASES IN AMORPHOUS SILICON FOR MeV HELIUM IONS c72
F. Fujimoto, K. Komaki, A. Optuka, K. Kawatsura, K. Ozawa, T. Shimada (Hitachi Central Research Lab.), and Y. Katayama (Hitachi Central Research Lab.) *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 101-107 refs Prepared in cooperation with JAERI (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

The stopping cross sections of argon, krypton and xenon inside amorphous silicon for alpha particle, in which the concentrations of argon, krypton and xenon were 8,7, and 4 at %, respectively, were measured by the Rutherford backscattering method in the incident energy range from 1.0 to 2.6 MeV for argon and 1.0 to 1.6 MeV for krypton and xenon. If the stopping cross section of silicon given by Ziegler is used and Bragg's rule is assumed, the obtained values of each rare gas were about 30% lower than those for gaseous state given by Ziegler in the energy region near to 1 MeV. R.J.F.

N83-27708# Oak Ridge National Lab., Tenn. Health and Safety Research Div.
THE STOPPING POWER OF AN ELECTRON GAS FOR SLOW IONS c72
R. H. Ritchie *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 108-114 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

It is shown that the density functional method, which proved to be very important in solid state theory, is capable of giving useful results in the theory of charged particle energy losses in solids. The stopping power of an electron gas for an ion moving at speed v, much less than the Fermi speed v sub f is discussed. R.J.F.

N83-27709# Chicago Univ., Ill. Dept. of Physics.
ION-CHANNELLING EFFECTS IN SCANNING ION MICROSCOPY WITH A Ga+ PROBE c76
R. Levi-Setti *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 115-130 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

The observation of crystalline structures with the scanning ion microscope (SIM) is shown to give information on the ion channel-

ling dependence of kinetic secondary electron emission, secondary ion emission and sputtering. The results of preliminary observations agree in general with the results of previous systematic measurements on monocrystals, already available in the literature. From this standpoint, the use of the SIM to visualize such effects is to be regarded as a practical application of ion channelling which may be valuable in the study of materials. In particular, the large contrast effects intrinsic to the method have obvious potential for the sensitive detection of defects and impurities in crystals, in particular at better spatial resulution than presented in this pilot study. There are, however, several unique aspects of the present approach as a method to investigate the ion solid interaction proper. These originate in the capability to correlate directly on a local scale, different secondary processes. R.J.F.

N83-27710# Hahn-Meitner-Institut fuer Kernforschung, Berlin (West Germany).
ANOMALIES IN THE THICKNESS DEPENDENCE OF THE ENERGY LOSS OF HELIUM AND NITROGEN IONS IN VERY THIN CARBON FOILS **c76**
J. P. Biersack and P. Mertens *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 131-135 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

energy losses of 300 and 610 keV He ions and of 300 keV N ions were measured in transmission experiments using carbon foils of 100 to 700 A thickness. The energy losses were determined either by a magnetic spectrometer calibrated by proton resonance or by an electrostatic analyzer. The targets were kept at 4 times 0.00000001 torr during beam exposures of less than 20 nC. The good vacuum and low ion dose helped to keep the targets unaffected during repeated measurements. R.J.F.

N83-27711# Atomic Energy of Canada Ltd., Chalk River (Ontario). Nuclear Labs.
ENERGY LOSS OF HEAVY IONS AS A FUNCTION OF TARGET THICKNESS: Ne YIELDS C **c72**
W. N. Lennard, H. R. Andrews, I. V. Mitchell, D. Phillips, and D. Ward *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 136-148 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

Extensive measurements to determine the target thickness dependence of heavy ion energy loss (dE/dx) for the Ne/C system. For ions transmitted with zero net deflection at velocities 0.75 < v/v sub o < 1.05, a significant dependence of dE/dx on foil thickness was observed which, parametrized through the Meyer-Klein-Wedell theory, identifies an inelastic component in the energy loss for scattered particles. A discussion is given of some of the precautions necessary in applying time of flight techniques to these energy loss measurements. R.J.F.

N83-27712# Waseda Univ., Tokyo (Japan). Lab. for Science and Engineering Research.
ESTIMATION OF FLUCTUATION IN RESTRICTED ENERGY LOSS **c72**
Tadayoshi Doke, Takayoshi Hayashi, and Katsuaki Nagata (Tamagawa Univ.) *In* ORNL Charge States and Dyn. Screening of Swift Ions in Soliids Jan. 1983 p 149-154 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

A computer program, ASB is used to estimate the ultimate mass resolution in a plastic detector. The comparison of ASB's calculation with the experimental results obtained by a gas counter is made. A comparison is also made between the computer program's computations and the results of the estimation of ultimate mass resolution in plastic detectors. R.J.F.

N83-27713# Oak Ridge National Lab., Tenn. Health and Safety Research Div.
ENERGY LOSSES TO SURFACE PLASMONS BY CHARGED PARTICLES **c72**
R. H. Ritchie and J. C. Ashley *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 164-166 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

The theory of charged particle energy loss to the surface plasmon field for a swift charged particle incident on a model metallic system is briefly reviewed. The expected energy losses for some representative cases are estimated. R.J.F.

N83-27714# Physical Review Letters, Ridge, N.Y.
STOPPING OF SWIFT IONS IN CONDENSED MATTER: THE THEORY OF EFFECTIVE CHARGE **c72**
George Basbas *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 167-174 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

The stopping power of a dielectric medium for a swift ion is calculated for a prescribed electronic structure on the projectile. The electronic charge carried by the projectile in traversing the medium is dictated by a stripping criteria. From the resulting stopping power an effective charge may be inferred. This charge successfully predicts the energy loss for a variety of ions and targets encountered in the laboratory. Author

N83-27715# New York Univ., New York. Dept. of Physics.
EFFECTIVE CHARGE OF ENERGETIC IONS IN METALS **c72**
M. Kitagawa (North Shore College) and Werner Brandt *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 175-187 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

The effective charge of energetic ion, as derived from stopping power of metals, is calculated by use of a dielectronic response function method. The electronic distribution in the ion is described through the variational principle in a statistical approximation. The dependence of effective charge on the ion velocity, atomic number and R sub s value of metal are derived at the low velocity region. The effective charge becomes larger than the real charge of ion due to the close collisions. The quasiuniversal equation of the fractional effective electron number of ion as a function of the ratio between the ionic size and the minimum distance approach is obtained. The comparison between theoretical and experimental results of the effective charge is performed for the cases of N ion into Au, C and Al. The equipartition rule of the partially ionized ion at the high velocity region is discussed. R.J.F.

N83-27716# New York Univ., New York. Lab. for Radiation and Solid State.
EFFECTIVE CHARGE OF LOW-VELOCITY NITROGEN, NEON AND ARGON IONS IN CARBON, ALUMINUM AND GOLD **c76**
Friedrich Schulz (Gesellschaft fuer Strahlen- und Umweltforschung mbH) and Werner Brandt *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 188-196 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

Stopping powers-S of low velocity nitrogen, neon and argon ions in carbon, aluminum and gold were measured to deduce effective charge fractions zeta = Z1 -1(S/Sp)1/2, where Z1 is the atomic number of the swift ion. The proton stopping powers Sp were taken from literature data. The experimental effective charge fractions are compared with a new theory which involves the calculation of the stopping SQ and SZ1 for an ion of charge Q and the respective bare nucleus. It is found that the zeta exp values are in much better agreement with zeta th than with the calculated mean degree of ionization of the swift ion in the target. The theory cannot fully account for all details of the experimental data. The observed Z1 dependence of zeta exp is more pronounced than predicted. E.A.K.

N83-27717# Waseda Univ., Tokyo (Japan). Dept. of Physics.
CALCULATION OF THE EQUILIBRIUM MEAN CHARGE OF HELIUM IONS **c72**
T. Kaneko and Y. H. Ohtsuki *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 197-208 refs (For

primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

The Z2-oscillation of the equiulibrium mean charge of 1 MeV He ions discovered by experiments was confirmed by calculating both the electron capture and loss cross sections. The two state atomic expansion method and Born approximation, respectively are employed. The calculations are in agreement with the experimental results. DOE

N83-27718# Kyoto Univ. (Japan). Dept. of Nuclear Engineering.
MEDIUM DEPENDENCE OF CHARGE STATE FRACTIONS OF MeV He BEAM **c72**
Fumio Fukuzawa *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 209-213 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

The charge state fractions of He ions in the energy range 0.5-2.3 MeV were measured by backscattering method. The charge states and energies of scattered He ions were analyzed with the combination of magnetic deflection and a position sensitive solid state detector. The method uses thick targets and the data over various kinds of target materials are obtained. Thick targets are treated easily to be heated up and also evaporated on the surface without destroying the condition of data acquisition. DOE

N83-27719# Kyoto Univ. (Japan). Dept. of Engineering Science.
CHARGE STATE DISTRIBUTION OF LIGHT IONS AT GLANCING COLLISION **c76**
M. Mannami, K. Kimura, and N. Kuwata *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 214-221 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

Measurement of charge state distribution of He+ and H2+ ions which were scattered in small angles at surfaces of Au, Ag and were reported. The advantage of the use of the glancing collision of ions at solid surface for the study of ion surface interaction is that the dwell time of ion near solid surface can be made more than 100 times longer than that in normal transmission experiments. The longer dwell times may alter any contribution of solid surface to electron capture and loss of ions. DOE

N83-27720# Argonne National Lab., Ill. Physics Div.
INTERACTIONS OF FAST MOLECULAR IONS TRAVERSING THIN FOILS: THE CONTRIBUTION FROM FIELD-IONIZED RYDBERG ATOMS IN MEASUREMENTS ON CONVOY ELECTRONS **c76**
Donald S. Gemmell *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 222-255 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

Experiments with fast (MeV) molecular ion beams which offer many possibilities for the study of atomic collisions in solids are reported. The possibility of determining the force fields (primarily the induced electric field) which surround ionic fragments traversing a solid are indicated. These fields are evaluated not only at the fragments themselves but also in the spatial regions extending out to several Angstroms from the fragment positions. DOE

N83-27721# Tokyo Inst. of Tech. (Japan). Research Lab. for Nuclear Reactor.
INTERACTION OF HYDROGEN MOLECULAR IONS WITH THIN FOILS. PART 1: CONVOY ELECTRONS **c76**
N. Oda, Y. Yamazaki, and Y. Yamaguchi *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 256-269 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

Doubly differential electron spectra from thin carbon foils (2 to 20 (SIGMA)g/cm(2)) bombarded with 0.8 MeV/amu H(), H3(), and (3)He() ion beams were measured in the angular range 150 to 300. A predominant group of electrons whose velocities are centered about the ion velocity is observed even at these large angles, for thinner foils with molecular ions H2() and H3(). The yield of convoy electrons for H3() is always larger than that for H2() and H3() are consistent with the model which shows that the electron loss process is the dominant mechanism for producing convoy electrons. DOE

N83-27722# Tokyo Inst. of Tech. (Japan). Research Lab. of Nuclear Reactors.
INTERACTION OF HYDROGEN MOLECULAR IONS WITH THIN FOILS. PART 2: BALMER EMISSION **c76**
H. Kobayashi (Rikkyo Univ.) and N. Oda *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 270-282 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

Relative emission yields of Balmer (-), (ALPHA), (BETA), and delta lines as functions of the dwell time, t/sub D/, in thin carbon foils were measured with beams of H(), H2(), and H3() impinging on thin carbon foils at 0.5 and 0.8 MeV/amu. Large molecular enhancement of emission yields of Balmer lines was observed for H2() and H3() beams, where (i) the molecular enhancement for H3() is higher than that for H2() over both the range of the corresponding principal quantum number (n = 3, 4, 5, and 6) and the range of the dwell time measured, and (ii) the molecular enhancement for both H2() and H3() rapidly increases when the dwell time decreases to values less than approx. 2 fs. Relative populations of n-levels in hydrogen are derived from the relative yields of Balmer lines as functions of n and the dwell time t/sub D/. The molecular enhancement for relative populations is compared with the molecular enhancement for the other kind of quantity such as the neutral hydrogen yields. DOE

N83-27723# Tokyo Inst. of Tech. (Japan). Research Lab. for Nuclear Reactors.
INTERACTION OF HYDROGEN MOLECULAR IONS WITH THIN FOILS. PART 3: INNER-SHELL IONIZATION **c76**
Y. Yamazaki and N. Oda *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 283-292 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

From measurements of electron spectra ejected in the backward direction from oxidized aluminum foil, it was found that H2() ions (0.8 to 1.2 MeV/amu) produce (1.4 to 1.6) + or - 0.2 times as many A1-L2 3 VV Auger electrons per proton as H() ions do at the same velocity. This enhancement of the Auger electron yield for H2() ions is mainly attributable to the vicinage effect of the constituent nuclei of molecular ions. Appreciable molecular enhancement of Auger electron yield was not observed on similar measurements of Auger electrons from oxide free aluminum and carbon foils. DOE

N83-27724# Los Alamos Scientific Lab., N. Mex.
PROCEEDINGS OF THE 1981 LINEAR ACCELERATOR CONFERENCE
Robert A. Jameson, ed. and Louise S. Taylor, ed. Feb. 1982 398 p refs Conf. held in Santa Fe, N. Mex., 19-23 Oct. 1981 Sponsored by DOE
(DE82-013754; LA-9234-C) Avail: NTIS HC A17/MF A01

The progress of FMIT (a 35-MeV, 100-mA, 100% duty factor deuteron linac being developed for Fusion Materials Irradiation Testing) was reported. The development of this accelerator is important to applications of linacs. Interest in the use of accelerators for production of nuclear fuel is renewed. These requires proton or deutron beams in the gigaelectron volts energy range and several hundred milliampere continuous currents. The success of FMIT could therefore strongly influence the development of CW linac applications. It is viewed as a proof of principle demonstration of the ability to handle large beam currents and manage the problems associated with continuous radio frequency (rf) power. The problems concerning continuous beams were discussed with respect to ion source design, nondestructive beam diagnostic, etc. The major machine development sparked by the FMIT project was the RFQ (radio frequency quadrupole). For individual titles, see N83-27725 through N83-27790.

N83-27725# Fermi National Accelerator Lab., Batavia, Ill.
THE LIVERMORE MTA PROJECT AND ITS INFLUENCE ON MODERN LINACS **c72**
Philip V. Livdahl *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 5-11 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

A series of linear accelerators were built and tested. The characteristics and performance of the prototypes, and how the prototype experience influenced linac development are discussed. S.L.

N83-27726# Atomic Energy of Canada Ltd., Chalk River (Ontario). Accelerator Physics Branch.
LOW ENERGY 100 PERCENT DUTY FACTOR ALVAREZ LINACS AT CHALK RIVER **c72**
J. Ungrin, J. C. Brown, B. G. Chidley, R. M. Hutcheon, G. E. McMichael, and S. O. Schriber *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 12-14 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

Experience with RF joints in a CW Alvarez linac is reviewed together with details of renewed tests on a flexible drift tube suspension. Mechanical and RF design of a replacement 268 MHz linac are discussed. Author

N83-27727# Gesellschaft fuer Schwerionenforschung m.b.H., Darmstadt (West Germany).
STATUS REPORT ON OPERATION AND UPGRADING OF THE UNILAC **c72**
N. Angert and D. Boehne *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 15-17 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

A review is given on five years of operation of the Unilac heavy ion linear accelerator. Important developments of subsystems and their present status are described. The current upgrading, initiated mainly to increase the output energy to 20 MeV/u for the heaviest elements, includes also an extensive improvement program of existing equipment. The injector beam line is completely reconstructed in order to increase the radial acceptance by a factor of three, and, in addition, part of the control system is prepared for multibeam operation. Author

N83-27728# Nuclear Research Center, Karlsruhe (West Germany). Inst. for Nuclear Physics.
THE LINEAR ACCELERATOR FOR THE PROPOSED GERMAN SPALLATION SOURCE **c72**
A. Citron *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 18-21 ref (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

The feasibility of a spallation neutron source was studied. It comprises a proton linear accelerator. The basic parameters of this accelerator are discussed, in particular those typical for the application envisaged. Particular emphasis is put on the problem of beam loss. The neutron source should have an average thermal neutron flux comparable to that from high flux reactors. The neutron yield is, in a very rough approximation, proportional to the power deposited by the beam in the target. Neutronics calculations, checked by recent measurements, show that a beam power of about 5.5 MW on a Pb target is needed. S.L.

N83-27729# Mainz Univ. (West Germany). Inst. fuer Kernphysik.
OPERATING EXPERIENCE WITH MAMI 1 **c72**
H. Aufhaus, H. Euteneuer, H. Herminghaus, W. Heyne, K. H. Kaiser, H. J. Kreidel, U. Ludwig-Mertin, K. Merle, H. vonderSchmitt, and H. Schoeler *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 22-24 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

MAMI I, a 14 MeV room temperature racetrack microtron for CW operation, ran for about 1200 hours, showing quite satisfactory performance. Good reproducibility of beam optimization and excellent long term stability of the beam during a run was shown. S.L.

N83-27730# Argonne National Lab., Ill.
STATUS OF THE ARGONNE SUPERCONDUCTING-LINAC HEAVY-ION BOOSTER **c72**
J. Aron, R. Benaroya, L. M. Bollinger, B. E. Clifft, K. W. Johnson, P. Markovich, J. M. Nixon, R. Pardo, K. W. Shepard, and G. Zinkann *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 25-28 refs (For primary document see N83-27724 16-70)
(Contract W-31-109-eng-38)
Avail: NTIS HC A17/MF A01

The Superconducting-Linac Heavy-Ion Booster is nearly complete. The linac now contains 22 of the complement of 24 resonators which will eventually be installed. During the construction period, the completed portion of the linac has provided useful beams for nuclear and atomic physics experimental programs. The linac control system was developed so that much of the more complex control functions are performed automatically. S.L.

N83-27731# Los Alamos Scientific Lab., N. Mex.
OCTUPOLE FOCUSING IN TRANSPORT AND ACCELERATION SYSTEMS **c72**
K. R. Crandall, M. Pabst, R. H. Stokes, and T. P. Wangler *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 31-35 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

The radio-frequency quadrupole (RFQ) linac is capable of accelerating high current, low velocity ion beams. In accelerator systems comprising an RFQ and higher velocity accelerating structures, the current bottleneck still typically occurs within the RFQ. This limiting current is quite high in most cases, but linacs with even higher currents may be required. Higher multipole systems are studied to determine their capability for focusing and accelerating very high currents. A radio frequency octupole (RFQ) transport system was examined, and a smooth approximation analytical description that includes the conditions for input radial matching of a zero space charge beam was developed. A multiparticle beam dynamics simulation program that accepts the low current matched beam and gradually increases the beam current as it is transported was constructed. S.L.

N83-27732# Los Alamos Scientific Lab., N. Mex.
MATCHING THE RF QUADRUPOLE BEAM TO THE DRIFT TUBE SECTION IN THE FMIT ACCELERATOR **c72**
G. P. Boicourt, R. A. Jameson, and R. S. Mills *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 36-38 ref (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

The beam produced by the Fusion Materials Irradiation Test radio frequency quadrupole (RFQ) accelerating structure must be matched to the drift tube linac (DIL) structure that follows, because minimum beam spill is a primary concern, a matching criterion that considers the beam edges as well as the rms properties is needed. The RFQ's vanes were flared, and the strengths of the first quadrupoles in the DTL were adjusted to achieve optimum performance downstream. Numerical methods used to set the quad gradients, and some experience with various matching criteria are described. The match achieved is compared with matches obtained by other methods. S.L.

N83-27733# Kernforschungszentrum, Karlsruhe (West Germany).
DEAD BEAT FILLING AND FEEDFORWARD RF CONTROL FOR THE SPALLATION NEUTRON SOURCE SNQ **c72**
D. Schulze *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 39-42 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

For the 1.1 GeV-100 mA Spallation Neutron Source SNQ1 operation costs and beam losses ask for the possible potential of

RF control improvements. Two methods are investigated. First, in order to increase the overall RF efficiency, the cavity field is built up as fast as possible in the open loop state of feedback control and in detuned position of the cavity in such a manner that the cavity with beam is matched to the generator. It is shown that this requires the simultaneous application of a generator amplitude and a generator phase step. Secondly, a feedforward control system is proposed, which reduces the amplitude and phase control error caused by an arbitrary beam transient into the limits of + or - 0.1% and + or - 0.1 deg and maintains these error limits in the presence of parameter drift. S.L.

N83-27734# Kernforschungszentrum, Karlsruhe (West Germany).
PREACCELERATOR DESIGN AND COMPONENT DEVELOPMENT FOR THE SNQ LINEAR ACCELERATOR **c72**
B. Piosczyk *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 43-45 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

An electrostatic preaccelerator for a proton linear accelerator was designed. Considerations and requirements concerning the layout are presented. In addition some experimental work on a magnetic multipole ion source as well as on extraction and ion beam transport was done. Results and remaining problems are pointed out. S.L.

N83-27735# Atomic Energy of Canada Ltd., Chalk River (Ontario). Accelerator Physics Branch.
A BEAM CAVITY INTERACTION COMPUTER CODE FOR LINACS **c61**
K. C. D. Chan and J. McKeown *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 46-48 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

A computer code BCI was used to calculate the energy loss of beam bunches in two types of cavities. The merit of the proposed on axis coupled structure for CHEER is discussed in terms of beam energy loss. A calculation for a simple structure consisting of two accelerating cells and a coupling cell is performed. The amplitude modulation of the wake field is interpreted as the excitation of the zero and pi coupled resonator modes and coupling coefficients are derived. Beam loading of a CW linear accelerator is studied by calculating the bunch energy loss and cavity energy when a cavity is excited resonantly with a series of beam bunches. Calculations of nonresonant excitation are also presented. S.L.

N83-27736# Atomic Energy of Canada Ltd., Chalk River (Ontario). Accelerator Physics Branch.
DESIGN AND CONSTRAINTS FOR THE ZEBRA INJECTOR, RFQ AND DTL **c72**
B. G. Chidley, J. C. Brown, G. E. McMichael, S. O. Schriber, M. R. Shubaly, and J. Ungrin *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 49-52 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

Zero Energy Breeder Accelerator (ZEBRA) is a proposed laboratory test accelerator designed to produce the full accelerator-breeder beam current of 300 mA at only 1% of the final energy of 1 GeV. Being an experimental prototype, it will be heavily instrumented to diagnose performance under conditions typical of the low energy portion of an accelerator breeder. It will consist of 3 sections - a dc injector, an RFQ buncher-preaccelerator, and a drift tube Alvarez linac. Several constraints are introduced by its eventual application as an injector for an accelerator breeder including variable beam current, economic accelerting gradients that will result in reliable operation, frequency choice and frequency multiplication between the RFQ and Alvarez linacs. This paper will discuss the constraints and present the rationale for the current reference design. Author

N83-27737# Fermi National Accelerator Lab., Batavia, Ill.
LOSS MONITORS FOR THE FERMILAB LINAC **c72**
L. J. Allen, C. D. Curtis, and B. M. Hanna *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 53-55 ref (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

A system of beam-loss monitors was installed in the FNAL 200-MeV linac. It consists of two-foot long ion chambers installed two per tank and six in the 200-MeV diagnostics area. The loss data are available in the main control room via computer and as real time video signals. A high main amplifier is required for those monitors near the linac cavities because of the normally low losses. System description results of performance tests and examples of monitor use as a tool to assist in linac tuning are presented. Author

N83-27738# Atomic Energy of Canada Ltd., Chalk River (Ontario). Accelerator Physics Branch.
A MICROPROCESSOR-CONTROLLED BEAD PULLER FOR RF CAVITY MEASUREMENTS **c72**
J. D. Hepburn and W. L. Michel *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 56-61 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

A microprocessor-controlled bead puller is being developed to provide a sophisticated, self contained bead pull facility with local data analysis. The following features are incorporated: (1) continuous bead travel to minimize lateral vibrations, (2) 0.1 mm (or better) bead position resolution, (3) up to 5 m total pull length, with steps as small as 0.5 mm, (4) local cassette storage of data, (5) all operations controlled by software via a keyboard, (6) provision of a link to the main CRNL computer, and (7) local programs for bead pull control and data analysis. The facility is described and impressions of its operation given. Author

N83-27739# Stanford Linear Accelerator Center, Calif.
CID THERMIONIC GUN SYSTEM **c33**
R. F. Koontz *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 62-64 refs (For primary document see N83-27724 16-70)
(Contract DE-AC03-76SF-00515)
Avail: NTIS HC A17/MF A01

A new high-current thermionic gun was installed on the CID injector at SLAC and brought into operation. The gun and pulser system generate three nanosecond pulses of about six amps peak which, when bunched in the subharmonic buncher system, produce in excess of 10 to the 11 electrons in a single S-band accelerated bunch. Preliminary operation of the gun is described, and details of the avalanche cathode drive pulser are presented. Author

N83-27740# Atomic Energy of Canada Ltd., Chalk River (Ontario). Accelerator Physics Branch.
CONSTRUCTION OF A HIGH-POWER RF RESONANT TEST LOAD **c33**
J. Ungrin, J. C. Brown, B. G. Chidley, S. B. Hodge, G. E. McMichael, S. O. Schriber, and R. B. Turner *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 68-70 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

A high-power resonant load was constructed at Chalk River as part of a program to develop high current CW linacs. The aluminum load designed to dissipate 400 kW CW is resonant at 270 MHz to be compatible with an existing RF amplifier. It was designed for high-power testing of accelerator components such as coupling loops, loop windows and tuners. Eleven ports were built into the cylindrical geometry to test flexible drift-tube and post-coupler suspensions as well as several types of metal-vacuum seals. Mechanical and RF design details are discussed. Author

N83-27741# Los Alamos Scientific Lab., N. Mex.
TUNING EXPERIENCE WITH THE FMIT SCALE-MODEL DRIFT-TUBE LINAC **c72**
Larry M. Earley, James M. Potter, and Arlo J. Thomas *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 74-76 ref (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

A scale model of the Fusion Materials Irradiation Test Facility (FMIT) 80-MHz drift-tube linac (DTL) was constructed to investigate the tuning procedure. A post-coupled Alvarez with couplers located on alternate drift tubes is shown. The model DTL has 16 cells and was constructed to have the accelerating mode at 367 MHz. The mode spectrum was measured for various post penetrations, and field profiles of the modes were recorded. The field profiles were measured by using a beadpull apparatus, together with an automatic data-acquisition system. Tilt sensitivity measurements were performed to find the optimum post penetrations for stabilizing the accelerating mode. Author

N83-27742# Atomic Energy of Canada Ltd., Chalk River (Ontario). Accelerator Physics Branch.
BRAZING TECHNIQUES AND ALLOYS FOR ACCELERATOR RF COMPONENTS **c26**
R. B. Turner and J. Ungrin *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 77-79 ref (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

Techniques were developed for brazing thin flat sheets and for using electron beam heating to provide braze melt temperatures in situations where furnace brazing is not possible. These techniques are discussed and the results of a survey of braze alloy resistivities are presented. Author

N83-27743# Nihon Univ., Tokyo (Japan). Atomic Energy Research Inst.
EFFECTS OF RADIAL SUPPORT STEMS ON THE DISK-AND-WASHER STRUCTURE **c37**
K. Hayakawa, K. Tsukada, K. Sato, and N. Nakamura *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 80 ref (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

Measurements of the Q value have been done on the disk-and-washer cavities of beta=1 that made by copper at 2856MHz for the test of electron linear accelerator structures. The washers are supported by the radial stems. In the present study materials (copper and Teflon) and number of the stems are changed. Linear relations between number of the stems and the values of I/Q's and resonance frequencies are found using the Teflon stems. For linear extrapolation to the case of no stem, the I/Q and resonance frequency are close to the values calculated by using the computer program SUPERFISH. For the copper stems, no systematic relations are found for the P/2A mode. Author

N83-27744# Johann-Wolfgang-Goethe-Universitat, Frankfurt am Main (West Germany). Inst. fuer Angewandte Physik.
A RFQ CONCEPT USING CIRCULAR RODS **c72**
P. Junior, H. Deitinghoff, K. D. Halfmann, H. Klein, and A. Schempp *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 81-83 refs Sponsored by the Bundesministerium fuer Forschung und Technologie (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

Emphasis is on a RFQ configuration, which differs from the one used in Los Alamos however, consisting of modulated circular rods. The linac is generated with respect to a maximum beam current. Author

N83-27745# New England Nuclear Corp., Chelmsford, Mass.
A VARIABLE STRENGTH PERMANENT MAGNET DIPOLE
R. D. Hay and C. G. Masi *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 84-86 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

The use of homogenizing spaces between segments to produce beam optics quality fields over 80% of the magnet gap is described. The use of counter rotating dipole rings to vary the dipole bending strength and the effects of fringing fields are also described. Author

N83-27746# Brookhaven National Lab., Upton, N. Y. Accelerator Dept.
FIRST RESULTS ON BNL H- MEQALAC **c72**
G. Gammel, J. Brodowski, K. Dobbs, J. Keane, A. Maschke, E. Meier, and R. Sanders *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 89-91 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

Initial results of a second MEQALAC test which explored higher frequency operation with smaller bore size are described. The current density was higher by up to a factor of seven. This MEQALAC was a four beam H-accelerator. Conceivably, it could lead to a replacement for relatively bulky and expensive Cockcroft-Walton pre-injectors. Author

N83-27747# Institute for Theoretical and Experimental Physics, Moscow (USSR).
THE PULSED PROTON PROTOTYPE OF A HIGH CURRENT ION LINAC **c72**
R. M. Vengrov, E. N. Daniltsev, I. M. Kapchinskij, A. M. Kozodaev, V. V. Kushin, N. V. Lazarev, A. A. Nikitin, and I. V. Chuvilo *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 92-95 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

The use of the spatial uniform quadrupole focusing at the optial stages of acceleration proposed approximately 10 years ago1,2 turned out to be rather fruitful for linac techniques. The accelerators (RFQ) of such type are designed. The practical application of the RFQ accelerating structure in the ITEP is tightly connected with design of a new proton synchrotron injector, allows placing in the same building an injector with output energy of 40-50 MeV. More imporments were made in the new injector besides RFQ structure: Alvarez structure will operate with doubled frequency, permanent magnets will be used in drift tubes, linar control will be automated, and will be connected with the Synchrotron computer. E.A.K

N83-27748# Johann-Wolfgang-Goethe-Universitat, Frankfurt am Main (West Germany). Inst. fuer Angewandte Physik.
PROPERTIES OF A 0-MODE RFQ STRUCTURE AND RECENT EXPERIMENTAL RESULTS **c72**
H. Klein, A. Schempp, H. Deitinghoff, P. Junior, J. Mueller, R. W. Mueller, K. Langbein, M. Daehne, W. Neumann, and A. Schoenlein *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 96-98 refs Sponsored by Bundeministerium fuer Forschung und Technologie (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

For low frequency operation of RFQ linacs a new RF scheme was developed. The linac consists of a chain of resonators, electrically excited in the 0-mode, the fields are generated by four modulated rods. The construction allows direct cooling of the electrodes and therefore cw operation. The RF properties like RP values, resonant frequencies, field distribution for systems with 4 and with 12 electrodes are presented. Coaxial 1/4 resonator sparking tests were performed at different pulse lengths and duty cycles. The status of the RFQ proton model, which uses the split coaxial structure as resonant cavity, is reported. E.A.K.

N83-27749# Maryland Univ., College Park.
ULTRAFISH: GENERALIZATION OF SUPERFISH TO m EQUAL TO OR LESS THAN 1 **c61**
Robert L. Gluckstern, Ronald F. Holsinger (Field Effects, Inc., Carlisle, Mass.), Klaus Halbach (LBL), and Gerald N. Minerbo (LASL) *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 102-107 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

The program ULTRAFISH which computes the resonant frequencies and fields in a electromagnetic cavity for azimuthally asymmetric modes was developed. The modes no longer can be characterized as TE and TM and lead to simultaneous equations involving two field components. These are taken to be rho epsilon pho and rho eta phi, in terms of which all four other field components are expressed. Several different formulations for solving the equations are investigated. The resulting matrix consists

of tridiagonal blocks of twice the dimension of SUPERFISH, but the matrix inversion and root finding procedures are the same. The SUPERFISH was generalized to obtain resonant frequencies of two dimensional cavities of arbitrary cross section. The SUPERFISH and ULTRAFISH are generalized to include regions of different permeability and dielectric constant. E.A.K.

N83-27750# California Univ., Berkeley. Lawrence Berkeley Lab.
BEAM DYNAMICS IN HEAVY ION INDUCTION LINACS **c72**
Lloyd Smith *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 111-115 refs (For primary document see N83-27724 16-70)
(Contract W-7405-eng-48)
Avail: NTIS HC A17/MF A01

The use of an induction linac to accelerate heavy ions for the purpose of providing the energy required to initiate an inertially confined fusion reaction was investigated various beam dynamical effects associated with high intensity heavy ion beams were examined. Transverse, longitudinal and coupled longitudinal transverse effects are discussed. E.A.K.

N83-27751# Max-Planck-Institut fuer Plasmaphysik, Garching (West Germany).
COMPUTER SIMULATION OF LONGITUDINAL-TRANSVERSE SPACE CHARGE EFFECTS IN BUNCHED BEAMS **c61**
I. Hofmann and I. Bozsik *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 116-119 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

A newly developed 2S D particle in cell code with r-z geometry was applied to derive criteria for longitudinal transverse emittance transfer in ellipsoidal bunched beam with strong space charge. It is found that emittance transfer occurs only if sigma sub l/sigma sub t is near or above 1.5, in which case equidistribution is approached due to coherent instability. It is shown that final bunch compression by an induction linac for Heavy Ion Fusion is as effective with a realistic distribution function leading to flat-top pulses at target as it is by simple envelope calculation. E.A.K.

N83-27752# Kernforschungszentrum, Karlsruhe (West Germany).
ON SPACE CHARGE INSTABILITIES AND EMITTANCE GROWTH IN RF LINACS **c72**
K. L. Mittag and H. G. Hereward *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 120-124 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

Conditions for minimum transverse emittance growth in RF linacs are discussed. Properties of coherent resonances are estimated. The results are checked by multiparticle simulations for realistic RF linac designs. It is found that the phase dependence of the RF defocusing and the envelope resonance are most important. E.A.K.

N83-27753# Stanford Linear Accelerator Center, Calif.
BEAM PARAMETER MEASUREMENTS FOR THE SLAC LINEAR COLLIDER **c72**
J. E. Clendenin, C. Blocker, M. Breidenbach, T. N. Constant, R. J. Hollebecek, M. B. James, M. J. Lee, G. A. Loew, R. J. Miller, J. L. Siegrist et al *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 130-136 refs (For primary document see N83-27724 16-70)
(Contract DE-AC03-76SF-00515)
Avail: NTIS HC A17/MF A01

A stable, closely controlled, high intensity, single bunch beam will be required for the SLAC Linear Collider. The characteristics of short-pulse, low-intensity beams in the SLAC linac were studied. A new, high intensity thermionic gun, subharmonic buncher and S-band buncher/accelerator section were installed. With these components, up to 1011 electrons in a single S-band bunch are available for injection into the linac. The first 100-m accelerator sector was modified to allow control of short pulse beams by a model driven computer program. Additional instrumentation, including a computerized energy analyzer and emittance monitor were added at the end of the 100-m sector. The beam intensity, energy spectrum, emittance, charge distribution and the effect of wake fields in the first accelerator sector are measured. The new source and beam control system is described and results of the beam parameter measurements are discussed. E.A.K.

N83-27754# Los Alamos Scientific Lab., N. Mex.
CAVITY LOADING ASSOCIATED WITH HIGH-CURRENT RF LINACS **c33**
Ricky J. Faehl, Don S. Lemons, and Lester E. Thode *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 137-141 refs Sponsored by AFOSR (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

The limitations on high current RF linacs due to cavity loading were studied. A linear analysis and self consistent particle simulations of a multipulsed 10 kA beam indicate that only a negligible small fraction of energy is radiated into nonfundamental cavity modes. DOE

N83-27755# Institute for Theoretical and Experimental Physics, Moscow (USSR).
THE 1981 LINEAR ACCELERATOR CONFERENCE ON PROTON BEAM EMITTANCE GROWTH IN LINAC **c72**
R. P. Kujbida, A. V. Kryzhanovskij, and N. V. Lazarev *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 142-146 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

The phenomenon of beam phase volume growth in acceleration process causes difficulties in designing and operating high average beam current linacs. The emittance growth in linac injectors of proton synchrotrons deteriorates the injection conditions. The linac I-2 belongs to one of the most intensive injectors with an output pulse current more than 200 mA. The beam phase volume blow up with the help of the linac was investigated. DOE

N83-27756# Atomic Energy of Canada Ltd., Chalk River (Ontario). Accelerator Physics Branch.
BEAM DYNAMICS STUDIES OF HIGH CURRENT RFQ AND DTL TANKS **c72**
G. E. McMichael and B. G. Chidley *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 149-152 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

An accelerator for spallation breeding of fissile fuel must have low beam loss and high acceleration efficiency. An extensive investigation using the PARMTEO and PARMILA computer beam dynamics codes was undertaken to obtain a reference design for a 100% duty cycle 300 mA 10 MeV proton linac called ZEBRA (zero energy breeder accelerator) that could serve as the first stage of an accelerator breeder. Current carrying capacity and accelerating efficiency in both RFQ's and DTL's are discussed. E.A.K.

N83-27757# Kernforschungszentrum, Karlsruhe (West Germany).
STATISTICAL TREATMENT OF MISALIGNMENTS IN LINEAR ACCELERATORS **c72**
M. Pabst and K. Bongardt *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 153-155 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

Geometric misaligned elements cause displacement of the beam center from the ideal accelerator axis and an increase of the beam radius, are discussed for any quasiperiodic accelerating structure and independent statistical distributed displacement errors of the single elements, a formula is presented by which both effects can be calculated. The obtained rms radius increase is almost indepenent of the beam current. The optimal position for steering magnets is determined. The radius increase is plotted as a function of the beam energy for the SNQ 324 MHz disk and washer proton linac. The main effect is the transverse displacement of a single quadrupole in a doublet. With 5 pairs of steering

magnets, the shift of the beam center away from the ideal axis is less than 5 mm everywhere. E.A.K.

N83-27758# Kernforschungszentrum, Karlsruhe (West Germany).
MOTION: A VERSATILE MULTIPARTICLE SIMULATION CODE **c72**

K. L. Mittag and D. Sanitz *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 156-158 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

The features of the newly developed multiparticle simulation code MOTION are outlined. It solves the general three dimensional equations of charged particle motion in arbitrary external fields, taking into account also the internal space charge forces. The transition from an unbunched to a bunched beam can be handled. Results are presented for focusing by a solenoid yielding a hollow beam profile. Further, the acceleration of a bunched beam by radio frequency gaps is calculated and compared to the results of the MAPRO code. Author

N83-27759# Kernforschungszentrum, Karlsruhe (West Germany).
FUNNELING OF HEAVY ION BEAMS **c72**

K. Bongardt *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 167-170 refs Prepared in cooperation with Karlsruhe Univ., West Germany (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

The funneling of heavy ion beams can be achieved by first bending the beams by septum magnets towards the common axis, and then deflecting them onto the axis by radio frequency deflector elements with time varying electric field strength. The main properties of these deflection elements are discussed. Formulaes are given for calculating the maximal allowed length of any transition section, if the longitudinal phase width should stay below an upper limit. These limits are important for a heavy ion beam funneling section. As an example, beam envelopes are shown for funneling two beams into one Alzarez accelerator. R.J.F.

N83-27760# Los Alamos Scientific Lab., N. Mex.
EVOLUTION OF THE RACETRACK MICROTRON CONTROL SYSTEM **c72**

E. R. Martin, C. M. Schneider, V. A. Martinez, R. E. K. Trout, and R. E. Gritzo *In its* Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 171-173 (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

The racetrack microtron (RTM) control system evolved around a standard bus structured (Multibus) distributed intelligence design that is sufficiently versatile to permit additions to the machine, and sufficiently RTM oriented to be relatively simple and within initial budget projections. The choice of a rather undistinguished eight bit processor made available a vast collection of inexpensive, well debugged utility and library software. The dual processor secondary station greatly simplified the software by taking advantage of the Multibus master slave serial bus arbitration protocol. Many commercial boards are available for use in this system, as needed; but religious adherence to a commercial only philosophy was sacrificed where the system performance and simplicity could be thereby enhanced. The operator controls are interrupt driven, providing best response time and system performance. R.J.F.

N83-27761# National Lab. for High Energy Physics, Ibaraki-Ken (Japan).
THE RF SYSTEM OF THE PHOTON FACTORY INJECTOR LINAC **c33**

S. Anami, J. Tanaka, S. Fukuda, T. Shidara, Y. Saito, R. Bissonnette, and H. Honma *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 177-179 (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

The radio frequency (RF) system of the Photon Factory 2.5 GeV injector electron linac now under construction is described. The RF system is composed of four stages: a master oscillator, a main booster amplifier (CW, 476 MHz), sub-booster amplifiers (pulse, 2856 MHz) and forty-two high power klystrons. The output RF power of the klystrons is 30 MW and the RF power of each klystron is split and fed into four accelerator guides composing one acceleration unit. Almost all of the RF equipment and components were installed in their positions and are in the final adjustment stage. R.J.F.

N83-27762# Atomic Energy of Canada Ltd., Chalk River (Ontario). Accelerator Physics Branch.
DESIGN CONSIDERATIONS FOR A DEVELOPMENTAL HIGH POWER COUPLING LOOP TO DRIVE A RESONANT LOAD **c33**

J. C. Brown and R. M. Hutcheon *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 180-182 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

A radio frequency (RF) drive loop was designed for a 400 kw, 100% duty factor, 270 MHz resonant cavity load. Operating experience with a high power Alvarez linac at Chalk River resulted in the evolution of design features that reduce multifactoring, field emission and rf arc track damage. The design provides means for the development of coaxial vacuum windows, the evaluation of loop conductor shapes and the investigation of RF arc propagation phenomena. R.J.F.

N83-27763# Atomic Energy of Canada Ltd., Chalk River (Ontario). Accelerator Physics Branch.
POST COUPLER STUDIES FOR ALVAREZ TANKS TO BE USED FOR HIGH POWER OR VARIABLE ENERGY **c44**

J. Ungrin, S. O. Schriber, and R. A. Vokes *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 183-186 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

The on-axis electric field in a 22 cell Alvarez tank that models the 0.8 MeV to 2.8 MeV section of a 268 MHz linac was stabilized with post couplers at a constant spacing from the drift tube. Measurements on field shaping with post couplers show that a step function in the on-axis field can be produced by introducing post coupler asymmetries. This field shaping which can be used to allow a wide range of output energy variability from an Alvarez linac can be produced with post couplers on each drift tube or on every second drift tube. R.J.F.

N83-27764# Los Alamos Scientific Lab., N. Mex.
VARIABLE-ENERGY DRIFT-TUBE LINACS **c72**

D. A. Swenson, T. J. Boyd, Jr., J. M. Potter, and J. E. Stovall *In its* Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 187-190 ref (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

A scheme is described to provide a variable energy capability for the drift tube linac, thus broadening the interest in this device for practical applications. The scheme is based on the use of post couplers to introduce steps in the accelerating fields, at specified points in the linac, to terminate the accelerator process and to produce beams of a variable energy. A relatively simple mechanical configuration for the post coupler is suggested. Author

N83-27765# Varian Associates, Palo Alto, Calif.
VARIABLE ENERGY STANDING WAVE LINEAR ACCELERATOR STRUCTURE **c72**

Eiji Tanabe and Gard Meddaugh *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 191-193 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

In response to the need for a more versatile single-section acceleration guide, a concept was developed which allows control of the electric field within a guide. The concept allows a step field discontinuity between two accelerating cavities to be varied at will, in a structure in which field relationship is usually invariable. The concept was implemented in several experimental models and two forms of the concept were used in operating guides. These performed as expected. Subsequently, both forms were

used in commercial accelerators, one medical and one industrial.
R.J.F.

N83-27766# California Univ., Berkeley. Lawrence Berkeley Lab.
LOOP COUPLING TO A RADIO FREQUENCY QUADRUPOLE RESONATOR (RFQ) **c32**
D. Howard and H. Lancaster *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 194-196 refs (For primary document see N83-27724 16-70)
(Contract W-7405-eng-48)
Avail: NTIS HC A17/MF A01

Providing radio frequency energy to an radio frequency quadrupole resonator using a coupling loop instead of a slot gives more freedom in vane size design (smaller space occupied by the loop) and the possibility of tight coupling to ease operational problems. Included is a discussion of various techniques to eliminate or separate the TE110 mode from the desired TE210 mode. Results on a model designed to test these techniques are discussed.
R.J.F.

N83-27767# Argonne National Lab., Ill.
LOW FREQUENCY RFQ LINACS FOR HEAVY ION FUSION **c72**
A. Moretti, J. M. Watson, R. L. Martin, R. J. Lari, and R. L. Stockley *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 197-199 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

The split coaxial resonator radio frequency quadrupole (RFQ) is a compact and efficient RFQ design for a low frequency heavy ion linac. A structure 1.2 m in diameter and 2 m long resonates at 12.5 MHz. Eight structures requiring about 560 kW of input radio frequency power are sufficient to satisfy the requirements of the design (accelerate 30 mA of Xe+1 with 97% transmission efficiency fronm 250 keV to 3.0 MeV). The structures need to be placed close together so that the modulated vanes are not interrupted. The Wideroe-Type structures are more complicated and more difficult to build. Hence, they are less attractive for heavy ions.
R.J.F.

N83-27768# Fukui Univ. (Japan).
A PROGRAM DEVELOPMENT FOR SUPERFISH **c61**
Shoji Okumura *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 200-202 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

A new computer program is coded to calculate radio frequency fields and resonant frequencies in axially symmetrical cavities. Algorithms for triangular mesh generation and finding the frequencies are the same as those in SUPERFISH, but the quadratic Langrange interpolation is used to approximate the fields in triangular elements. The test runs are made for a pill-box cavity with the numbers of calculating mesh points which are equivalent to the cases for SUPERFISH. Although noticeable improvements were not obtained for the frequencies, the test runs showed that the new program gives better accuracies for the field values than SUPERFISH.
R.J.F.

N83-27769# California Univ., Berkeley. Lawrence Berkeley Lab.
REVIEW OF INDUCTION LINACS **c72**
A. Faltens and D. Keefe *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 205-213 refs (For primary document see N83-27724 16-70)
(Contract W-7405-eng-48)
Avail: NTIS HC A17/MF A01

There has been a recent upsurge of activity in the field of induction linacs, with several new machines becoming operational and others in the design stages. The performance levels of electron machines have reached 10's of kiloamps of current and will soon reach 10's of MeV's of energy. Acceleration of several kiloamps of ion current has been demonstrated, and the study of a 10 GeV heavy ion induction linac for ICF continues. The operating principles of induction linacs are reviewed with the emphasis on design choices which are important for increasing the maximum beam currents.
Author

N83-27770# Maryland Univ., College Park.
DESIGN OF REC PERMANENT MAGNET QUADRUPOLES TAKING INTO ACCOUNT B, H NON-LINEARITY **c72**
Robert L. Gluckstern and Ronald F. Holsinger (Field Effects, Inc., Carlisle, Mass.) *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 214-218 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

Most Rare Earth Cobalt (REC) materials have linear behavior of B (parallel) vs H (parallel) with permeability about 1 over a wide range of H (parallel). However some of the materials with high magnetization become nonlinear in the 2nd quadrant of the B-H space, while others with lower magnetization depart from linearity in the 3rd quadrant. Since the normal quadrupole design will drive many segments into the second quadrant and some event into the 3rd quadrant, the non-linear behavior of B11 vs H11 can distort the quadrupole field usually desired. Calculations have been performed using the computer code PANDIRA to explore the magnitude of the distortion caused by these non-linearities. In this paper, the usual quadrupole design is modified to use segments of lower magnetization but greater linearity in those places where segments are driven magnetically into the 2nd and 3rd quadrants. Prescriptions are given for the opening wedge angle and easy axis orientation of each segment which lead to the vanishing of the unwanted multipole components.
B.W.

N83-27771# Fermi National Accelerator Lab., Batavia, Ill.
RECENT WORK ON COLLECTIVE ACCELERATORS **c72**
F. T. Cole *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 225-231 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

The state of work in the United States on collective acceleration and the state of its support led to the convening by the United States Department of Energy of a study group in the fall of 1981. The review given here grew out of the work of that study group. For the purpose of this review, collective accelerators ae divided into five general classes as follows: (1) Space-charge accelerators; (2) wave accelerators; (3) electron ring accelerators; (4) inverse-drag accelerators; and (5) collective-focusing accelerators. The different accelerator concepts the work in progress on them, and their applications. Finally, the conclusions of the study are outlined.
B.W.

N83-27772# Maryland Univ., College Park.
EXPERIMENTAL STUDIES OF ELECTRON BEAM FOCUSING WITH SOLENOID LENSES NEAR THE SPACE CHARGE LIMIT **c72**
M. Reiser, W. Namkung, P. Loschialpo, J. Suter, and J. D. Lawson (Science Research Council, Chilton, England) *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 235-238 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

Experimental studies of beam focusing with the first solenoid lens in the University of Maryland electron beam transport experiment (at 5kV, 230-310 mA) are reported. At zero magnetic field, the density profile and beam envelope are in agreement with theory. When the beam is focused with the lens, it becomes hollow, develops halos near the waist, and shows images of the anode mesh downstream from the waist. When the diameter is reduced, the beam is less hollow, the halos are smaller and the images improved. These effects are attributed to lens aberration, nonlinear space-charge forces, beam rotation, and transverse velocity components.
Author

N83-27773# Mainz Univ. (West Germany). Inst. fuer Kernphysik.
BEAM INSTABILITIES IN RACE TRACK MICROTRONS **c72**
H. Euteneuer, H. Herminghaus, and R. Klein *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 239-241 refs

(For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

Several limitations of the benefits of the race track microtron (RTM) as an economic CW electron accelerator are discussed. For beam blowup some final results of our investigations for the Mainz Microtron are given. The other two effects presented more generally are beam diffusion by imperfections of the optical elements of a RTM and the deterioration of transverse phase space by synchrotron radiation. Author

N83-27774# Argonne National Lab., Ill. Accelerator Research Facilities Div.
FOCUSSING CONSIDERATIONS IN THE RACE TRACK MICROTRON AND DOUBLE-SIDED MICROTRON c72
Eugene P. Colton *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 242-244 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

General designs for quadrupole multiplet systems for use in both the Race Track Microtron (RTM) and Double-Sided Microtron (DSM) are developed. The quadrupole multiplet consists of five quadrupoles forming two mirror symmetric optical systems; furthermore, both systems are telescopic in the bending plane and exhibit dispersion zeroes in the centers of the second and fourth quadrupoles. The systems perform achromatic transformations and either rotate the incoming beam phase ellipse by 90 deg or introduce focussing into the system. Alternate telescopic systems utilizing three quadrupoles can be used at higher energies. Compact systems can be constructed using permanent magnets. Examples of these systems are presented as applied to the proposed Argonne National Laboratory 2-GeV RTM-DMS configuration. B.W.

N83-27775# Mainz Univ. (West Germany). Inst. fuer Kernphysik.
AUTOMATIC BEAM-STEERING OF THE MAINZ MICROTRON c72
H.-J. Kreidel and K. Merle *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 245-247 (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

The Mainz Microtron (MAMI) will consist of three cascaded Race-Track-Microtrons with a Van De Graaff as injector. The first stage, delivering an output energy of 14 MeV, has been working for about two years. The second stage is presently under construction and will increase the output-energy to 180 MeV. A principal problem with these microtrons is the precise positioning of each individual turn to the middle-axis of the acceleration RF section. Therefore in front of and behind the section monitors for detecting the beam-position in each of the 20 turns of the first stage has been installed. A computer reads out this data and determines the setting of the 80 steering coils in the return-tracks of the beam (two coils in horizontal and vertical direction for each turn). The following describes the details of this system. B.W.

N83-27776# Atomic Energy of Canada Ltd., Chalk River (Ontario). Accelerator Physics Branch.
ION SOURCE DEVELOPMENT AND INJECTOR DESIGN FOR ZEBRA c72
M. R. Shubaly *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 251-253 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

The requirements for high and variable current in ZEBRA, and the acceptance limits (on both energy and phase space distribution) of the RFQ place stringent demands on the injector design. For variable current, the ion source extraction voltage must be varied over a wide range to maintain a matched beam, however the RFQ has a limited range of injection energy. The 75 keV injection energy made necessary by current limits in the RFQ will require that care be taken to ensure reliability. Beam spill limits in downstream structures and RFQ beam dynamics require minimal beam halo and precise control of the phase space distribution. Following a discussion of these problems, and the approaches being taken at Chalk River to solve them, a conceptual design for the ZEBRA injector is presented. B.W.

N83-27777# Mission Research Corp., Albuquerque, N. Mex.
THE IMAGE DISPLACEMENT INSTABILITY IN RADIAL LINE ACCELERATORS c72
B. B. Godfrey, R. J. Adler, M. M. Campbell, D. J. Sullivan, and T. C. Genoni (AFWL) *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 257-259 refs Sponsored by AFWL (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

In this work the discussion is confined primarily to the m = 1 instabilities induced by an accelerating (or nonaccelerating) gap in the drift tube, the beam breakup instability and its zero frequency analog, the image displacement instability. These instabilities are particularly dangerous in high current accelerators where they can rapidly amplify an initial small transverse displacement of the beam to such an extent that it strikes the drift tube wall. A recently constructed radial line accelerator is briefly described. The beam breakup and image displacement instability theories are then presented, and sample calculations indicating their rate of growth in various cases are given. The image displacement instability has been experimentally observed and results from the experiment as well as from corresponding three-dimensional numerical simulations are discussed. B.W.

N83-27778# Mainz Univ. (West Germany). Inst. fuer Kernphysik.
THE DESIGN OF DOUBLE SIDED MICROTRONS c72
H. Heringhaus, K.-H. Kaiser, and U. Ludwig-Mertin *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 260-262 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

A severe problem in the design of double sided microtrons (DSM) which could supersede the race track microtron (RTM) in the 1-2 GeV range mainly because of its smaller magnet weight is the strong vertical defocusing in the bending magnets. Several possibilities to overcome this difficulty are discussed and a special beam optical design making use of the large longitudinal stability of the DSM is presented. Author

N83-27779# Stanford Linear Accelerator Center, Calif.
(Contracts DE-AC03-76SF-00515; DE-AS05-80ER-10633)
DESIGN OF AN ELECTRON BEAM SPECTRAL MODIFICATION SYSTEM c72
J. C. Sheppard, R. C. York, B. E. Norum, and J. S. McCarthy *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 266-269 refs Prepared in cooperation with Virginia Univ., Charlottesville (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

The design of a spectral modification system (SMS) is described for use with the proposed NEAL linac-pulse stretcher ring, CW electron beam facility. The SMS allows tailoring of the energy distribution of electrons in beams produced by a pulsed linac operating the transient beam loading (TBL) regime. Modification of the energy distribution of electrons injected into the pulse stretcher ring will increase the duty factor of current extracted from the ring and improve the efficiency of the extraction process. Physically, the SMS consists of an anisochronous, achromatic magnetic lattice followed by a pair of traveling wave accelerating sections. For beams in the energy range of 500 MeV to 4 GeV, TBL ripple on the energy envelope of microsecond long beam spills is expected to be reduced from 1% peak-peak to less than 0.01% while the desired width of the energy profile due to the phase extent of the microbunches in the beam spill is preserved. B.W.

N83-27780# Argonne National Lab., Ill.
LONGITUDINAL BEAM OPTIMIZATION OF THE ARGONNE SUPERCONDUCTING HEAVY-ION LINER ACCELERATOR c72
R. Pardo, L. M. Bollinger, and W. Henning *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 270-273 refs (For primary document see N83-27724 16-70)

(Contract W-31-109-eng-38)
Avail: NTIS HC A17/MF A01

The various aspects of optimizing the accelerator system in longitudinal phase space are discussed. There are three major components which must be properly adjusted: the buncher system, which must produce a beam bunch of approximately 100 ps FWHM at the entrance to the linac, the linac, which must accelerate the ions while maintaining an undistorted phase ellipse, and the rebuncher/debuncher, which must be optimized to produce either a time focus on target or an improved energy resolution. Optimization of the buncher system and the linac is automatic and under computer control. Rebuncher optimization is only partially computer controlled at this time. Author

N83-27781# Mainz Univ. (West Germany). Inst. fuer Kernphysik.
A MODULAR SYSTEM FOR THE CONTROL OF COMPLEX ACCELERATOS USING PORTABLE SOFTWARE **c72**
H. vonderSchmitt and H. Aufhaus *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 274-276 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

When designing the Mainz Microtron control system, care was taken to achieve an expandable system with long lived application software. A multi-processor system was built from the beginning. The software is split into modules, according to function and position in hierarchy. The decoupling which results from modularity eases software development and maintenance. RATFOR was chosen as implementation language. With a message system for communication between the modules, several aims were reached: symbolic addressing of the accelerator components throughout the software layers, transparent access to I/O devices (CAMAC) at remote computers, multitasking in FORTRAN (and RATFOR) programs, and a separation layer for adaptation to different operating systems. Author

N83-27782# Fermi National Accelerator Lab., Batavia, Ill.
THE DISTRIBUTED CONTROL SYSTEM FOR THE FERMILAB 200 MEV LINAC **c33**
R. W. Goodwin and M. F. Shea *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 277-280 ref (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

A new MC68000-based distributed control system is currently being assembled and installed for use on the Fermilab 200 MeV Linac. Sixteen local secondary stations are interconnected by a 1-MHz, fiber optic, serial (SDLC Loop) communications link to a primary station. This primary station interfaces to the most computer and collects data from the secondary stations on behalf of either the most or other secondaries. IEEE-P796 (multibus+) compatible hardware is used throughout. The system features synchronous 15-Hz response, extensive integral local control capability and provision for display and control of remote parameters from any secondary console. Author

N83-27783# Fermi National Accelerator Lab., Batavia, Ill.
MODULATOR RELIABILITY AND BANDWIDTH IMPROVEMENT: REPLACING TETRODES WITH MOSFETS **c33**
A. R. Donaldson *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 284-286 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

Three types of power MOS field effect transistors (FET) were studied with the intent of replacing a parallel pair of vacuum tube tetrodes in a linear modulator. The tetrodes have the shortest lifetimes of any other tubes in the system. The FETs offer definite performance advantages when compared to bipolar transistors and definite cost advantages when compared to vacuum tubes. Replacement of the tetrodes does however require careful consideration of voltage, current and to a lesser extent bandwidth capability in order to enhance overall modulator reliability without compromising present performance. Author

N83-27784# California Univ., Berkeley. Lawrence Berkeley Lab.
LOW-COST MEGAWATT RF POWER SOURCES FOR LINEAR ACCELERATORS TO 70MHZ AND ABOVE **c33**
Jock A. Fugitt, Marvin L. Nolan, and Forrester K. Crosby *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 187-289 ref (For primary document see N83-27724 16-70)
(Contract W-7405-eng-48)
(LBL-13024) Avail: NTIS HC A17/MF A01

The new main RF amplifiers for the SuperHILAC are designed for high reliability, short repair time, and low cost. Innovative use of copper plated aluminum components cuts fabrication time, weight, and materials costs. The use of a simple, cylindrically loaded, gamma/2 anode resonator is cost effective and allows quick access to the tube when replacement is required. A high gain, neutralized, grounded cathode configuration simplifies the drive requirements. The EIMAC X2170 (8973) was chosen for proven reliability and low cost. Author

N83-27785# California Univ., Berkeley. Lawrence Berkeley Lab.
AN ANALYTICAL SOLUTION FOR THE ELECTRICAL PROPERTIES OF A RADIO FREQUENCY QUADRUPOLE (RFQ) WITH SIMPLE VANES **c33**
H. Lancaster *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 293-295 refs (For primary document see N83-27724 16-70)
(Contract W-7405-eng-48)
Avail: NTIS HC A17/MF A01

Although the SUPERFISH program is used for calculating the design parameters of an radio frequency quadrupole (RFQ) structure with complex vanes, an analytical solution for electrical properties of an RFQ with simple vanes provides insight into the parametric behavior of these more complicated resonators. The fields in an inclined plane wave guide with proper boundary conditions match those in one quadrant of an RFQ. The principle of duality is used to exploit the solutions to a radial transmission line in solving the field equations. Calculated are the frequency equation, frequency sensitivity factors (5), electric field (E), magnetic field (H), stored energy (U), power dissipation (P), and quality factor (Q). Author

N83-27786# Tokyo Univ. (Japan). Inst. for Nuclear Study.
MEASUREMENT OF MODEL INTER-DIGITAL H TYPE LINAC **c72**
T. Fukushima, T. Hattori, T. Hori, K. Sato, E. Tojyo, and K. Yoshida *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 296-298 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

The interdigital H type Linac (1H Linac) has high shunt impedance per unit length (Z sub s) for the acceleration of low velocity particles. The 1H Linac is suitable for heavy ion acceleration. Examination by model tank experiment is more efficient than by the computational means because the electromagnetic field in the tank is not symmetric. The aim of the series of measurements is to obtain the dependence of the shunt impedance on tank structure; the resonance characteristics for the various tank structure; the electric field distribution along the tank axis; and the effect of the tank end structure on the field pattern. Author

N83-27787# Tokyo Univ. (Japan). Inst. for Nuclear Study.
AN RFQ LINAC FOR HEAVY ION ACCELERATION **c72**
N. Ueda, S. Arai, T. Nakanishi, T. Hori, N. Tokuda, S. Yamada, T. Fukushima, M. Takanaka, A. Noda, and T. Katayama *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 299-301 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

An RF characteristic was studied on a radio frequency quadrupole (RFQ) model cavity with two kinds of vanes, straight and modulated. The measured resonant frequency is 295.0 MHz for the TE210 mode and well agrees with the calculated value 296.5 MHz by SUPERFISH for the straight vane. The measured one is 293.5 MHz for the modulated vane which has the same cross section as the straight vane at its quadrupole symmetry plane. The measured electric field in the acceleration bore agrees

with the calculated one within the statistical error. A sufficient mode separation and uniform field distribution were obtained with a single loop coupler which matches the cavity to the feeder line. Author

N83-27788# Argonne National Lab., Ill.
A 750 KEV RFQ LINAC FOR THE AGS POLARIZED PROTON PROGRAM **c72**
J. M. Watson, D. R. Moffett, A. Moretti, R. L. Stockley, and T. P. Wangler (LASL) *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 306-308 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

A radio-frequency quadrupole (RFQ) linac was chosen for use as the preaccelerator for the polarized H(-) beam. The low injection energy of 20 keV eliminates the need for installing the bulky and complex polarized ion source within a large high voltage dome. A preliminary design was completed which accelerates 1 mA of polarized H(-) from 20 keV to 750 keV with 98% transmission efficiency. The four vane structure with modulated vane tips was used as the linac cavity. It has an average aperture radius, r (sub0), of 0.47 cm and nominal normalized acceptance of 0.27 pi cm-mr. It was conservatively designed to operate with a maximum surface electric field strength of 22.4 MV/m. Author

N83-27789# Tokyo Univ. (Japan). Inst. for Nuclear Study.
NEW FORMULATION OF THE RFQ RADIAL MATCHING SECTION **c33**
N. Tokuda and S. Yamada *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 313-315 refs Prepared in cooperation with Lawrence Berkeley Lab., Calif. (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

The electric field potential function in an radio frequency quadrupoles (RFQ) radial matcher has been formulated, adopting the lowest order potential function expanded in a Fourier Bessel series. The focusing strength varies sinusoidally with the distance along the beam axis. The overlap between the time-dependent RFQ acceptance and the injected beam phase space area has been calculated. The overlap more than 90% is attained with a several cell long radial matcher. Author

N83-27790# Tokyo Univ. (Japan). Inst. for Nuclear Study.
BUNCHER SECTION OPTIMIZATION OF HEAVY ION RFQ LINACS **c72**
S. Yamada *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 316-318 refs Prepared in cooperation with Lawrence Berkeley Lab., Calif. (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

Some extensions in designing and optimizing a low intensity heavy ion radio frequency quadrupoles (RFQ) linac are developed. Linacs with transmissions of more than 90% which are somewhat shorter than those using the LASL prescription were obtained. The design equations and some examples of applications of this design procedure are described. Author

N83-27791# Stanford Linear Accelerator Center, Calif.
A FINITE-PARTICLE-NUMBER APPROACH TO PHYSICS
H. Pierre Noyes Oct. 1982 10 p refs Presented at the Symp. in Honor of the 90th Birthday of Louis deBroglie - Wave Particle Dualism, Perugia, Italy, 22-30 Apr. 1982
(Contract DE-AC03-76SF-00515)
(DE83-007014; SU-SLAC-PUB-2997; CONF-820473-2) Avail: NTIS HC A02/MF A01

A discrete, self generating and self organizing, recursive model and self consistent interpretive rules were used to construct (1) the scale constants of physics (3, 10, 137, 1.7 x 10 to the 38th power); (2) 3+ 1 Minkowski space with a discrete metric and the algebraic bound delta epsilon delta tau greater than or equal to 1; (3) the Einstein-deBroglie relation; (4) algebraic double slit interference; (5) a single time momentum space scattering theory connected to laboratory experience; (6) an approximation to wave functions; (7) local phase severance and hence both distant correlations and separability; (8) baryon number, lepton number, charge and helicity; (9) m/sub p//m/sub e/; and (10) a cosmology not in disagreement with current observations. DOE

N83-27792# General Electric Co., St. Petersburg, Fla. Components and Product Evaluation Lab.
INTERFACING A TORSION PENDULUM WITH A MICROCOMPUTER
J. A. Bush and J. W. Newby 24 Feb. 1983 15 p
(Contract DE-AC04-76DP-00656)
(DE83-004032; GEPP-TIS-699) Avail: NTIS HC A02/MF A01

Shear modulus testing is performed on a torsion pendulum as a means of gauging the state of cure for a polymer system. Collection and reduction of the data to obtain the elastic modulus necessitated extensive operator involved measurements and calculations, which were subject to errors. To improve the reliability of the test, an analog-to-digital interface was designed and built to connect the torsion pendulum with a minicomputer. After the necessary programming was prepared, the system was tested and found to be an improvement over the old procedure in both quality and time of operation. An analysis of the data indicates that the computer generated modulus data are equivalent to the hand method data, but potential operator errors in frequency measurements and calculations are eliminated. The interfacing of the pendulum with the computer resulted in an overall time savings of 52 percent. DOE

71 ACOUSTICS

Includes sound generation, transmission and attenuation. For noise pollution see *45 Environment Pollution.*

N83-27793*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
JT150 1/2-SCALE NOZZLE JET NOISE EXPERIMENT AND COMPARISON WITH PREDICTION
Donald E. Groesbeck and Charles A. Wasserbauer May 1983 26 p refs
(NASA-TM-83370; E-1636; NAS 1.15:83370) Avail: NTIS HC A03/MF A01 CSCL 20A

As part of a program to study flight effects on the exhaust noise of a full scale JT15D engine, static half scale model jet noise experiments were conducted. Acoustic data were recorded for microphone angles of 45 deg to 155 deg with jet conditions for the model scale nozzle corresponding closely to those at 55, 73 and 97 percent of corrected rated speed for the full scale engine. These data are useful for determining the relative importance of jet and core noise in the static full scale engine test data and will in turn allow for a proper evaluation of flight effects on the exhaust noise results. The model scale data are also compared with the coaxial jet noise prediction. Above 1000 Hz, the prediction is nominally 0 to 3 dB higher than the data. The arithmetic mean of the differences between the experimental OASPL and the predicted OASPL for all angles for each run ranged from 0 to -3.2 dB. The standard deviation of all the OASPL differences is 2.2 dB. The discrepancies are greatest at low primary jet velocities and appear to be due to inadequacy in the variable jet density exponent incorporated in the prediction procedure. S.L.

N83-27794*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LOW FLIGHT SPEED ACOUSTIC RESULTS FOR A SUPERSONIC INLET WITH AUXILIARY INLET DOORS
Richard P. Woodward, Frederick W. Glaser, and James G. Lucas [1982] 47 p refs Presented at the 19th Joint Propulsion Conf., Seattle, Wash., 27-29 Jun. 1983; sponsored by AIAA, SAE, and ASME
(NASA-TM-83411; E-1694; NAS 1.15:83411) Avail: NTIS HC A03/MF A01 CSCL 20A

A model supersonic inlet with auxiliary inlet doors and bounday layer bleeds was acoustically tested in simulated low speed flight

up to Mach 0.2 in the NASA Lewis 9x15 Anechoic Wind Tunnel and statically in the NASA Lewis Anechoic Chamber. A JT8D refan model was used as the noise source. Data were also taken for a CTOL inlet and for an annular inlet with simulated centerbody support struts. Inlet operation with open auxiliary doors increased the blade passage tone by about 10 dB relative to the closed door configuration although noise radiation was primarily through the main inlet rather than the doors. Numerous strong spikes in the noise spectra were associated with the bleed system, and were strongly affected by the centerbody location. The supersonic inlet appeared to suppress multiple pure tone (MPT) generation at the fan source. Inlet length and the presence of support struts were shown not to cause this MPT suppression. Author

N83-27795*# Lockheed Missiles and Space Co., Sunnyvale, Calif.
A PROCEDURE FOR COMBINING ACOUSTICALLY INDUCED AND MECHANICALLY INDUCED LOADS (FIRST PASSAGE FAILURE DESIGN CRITERION) Final Report
D. R. Crowe and W. Henricks Apr. 1983 88 p refs
(Contract NAS5-25156)
(NASA-CR-166824; NAS 1.26:166824; LMSC/D885405-SS-1633) Avail: NTIS HC A05/MF A01 CSCL 20A

The combined load statistics are developed by taking the acoustically induced load to be a random population, assumed to be stationary. Each element of this ensemble of acoustically induced loads is assumed to have the same power spectral density (PSD), obtained previously from a random response analysis employing the given acoustic field in the STS cargo bay as a stationary random excitation. The mechanically induced load is treated as either (1) a known deterministic transient, or (2) a nonstationary random variable of known first and second statistical moments which vary with time. A method is then shown for determining the probability that the combined load would, at any time, have a value equal to or less than a certain level. Having obtained a statistical representation of how the acoustic and mechanical loads are expected to combine, an analytical approximation for defining design levels for these loads is presented using the First Passage failure criterion. Author

N83-27796# Pennsylvania State Univ., University Park. Applied Research Lab.
INVESTIGATION OF THE COUPLING OF UNSTEADY LIFT TO LOW ORDER ACOUSTIC DUCT MODES IN AN AXIAL FLOW FAN M.S. Thesis
James Philip Cowan 17 Jun. 1982 145 p refs
(Contract N00024-79-C-6043)
(AD-A124819; ARL/PSU-TM-82-137) Avail: NTIS HC A07/MF A01 OSCL 20/1

By using flow distortion screens, the plane wave (0,0) and first higher order (-1,0) and (1,0) spinning modes were generated in a low-speed axial flow fan. The perpendicular unsteady lift force on a segment of a nine-bladed rotor and the acoustic pressure along the duct were measured simultaneously by a strain gage sensor and a flush-mounted microphone, respectively. The total pressure field downstream of the screens was measured by circumferentially traversing a Kiel probe. The typical signal-to-noise ratio was sufficiently high for the desired signal isolation with a spectrum analyzer. A phase-locked ensemble averaging technique was used to obtain amplitude and phase measurements of the periodic unsteady signals. Standing waves set up in the duct between the rotor and duct inlet seemed to cause a back-reaction effect which resulted in an increase and reduction of the unsteady lift force above and below expected levels. If these effects are taken into account, theoretical predictions coupling unsteady lift to acoustic far field pressure levels conform to measured data. Therefore, it is concluded that there is a definite coupling between unsteady lift and acoustic pressure in the duct, yet determination of an unambiguous coupling factor would require more extensive data acquisition. GRA

N83-27797# Scripps Institution of Oceanography, La Jolla, Calif. Marine Physical Lab.
INVESTIGATIONS OF THE 1 KHz SOUND ABSORPTION IN SEA WATER
Vernon Pitkin Simmons 15 Jan. 1983 163 p refs
(Contract N00014-75-C-0749)
(AD-A124888; MPL-U-11/83; SIO-REF-83-1) Avail: NTIS HC A08/MF A01 CSCL 20/1

Using a combination of sound absorption data from a large spherical resonator and relaxation frequency data from the temperature jump technique, it has been demonstrated that there is an increased sound absorption in sea water below approximately 1 kHz. The absorption mechanism has been traced to a chemical relaxation of boric acid. Observed and calculated data are in general agreement when a two step, three state boric acid ionization reaction is postulated. The observed sound absorption is attributed to the unimolecular second step of this reaction, with the faster bimolecular first step being of low sound absorption step being of low sound absorption magnitude and under diffusion control. The magnitude of the observed sound absorption is approximately nine times greater than the absorption calculated by considering only the contribution from the high frequency magnesium sulfate effect. There is an effect of bicarbonate on the low frequency absorption presumably through the buffering effect on the hydroxyl ion. GRA

N83-27798# Defence Research Establishment Atlantic, Dartmouth (Nova Scotia).
SOME SIMPLE FORMULAE FOR NORMAL MODE WAVE NUMBERS, CUTOFF FREQUENCIES AND THE NUMBER OF MODES TRAPPED BY A SOUND CHANNEL
Dale D. Ellis Nov. 1982 16 p Presented at the 101st Meeting of the Acoustical Soc. of Am., Ottawa, 18-22 May 1981
(AD-A124948; DREA-TM-82/0) Avail: NTIS HC A02/MF A01 CSCL 20/1

To a good first approximation acoustic propagation in an underwater sound channel is dominated by a finite number of trapped modes. However, exact solutions are known for only a few special cases making it necessary in general to use numerical methods to solve the normal mode equation. But often one is interested only in the gross features, such as the number of modes or cutoff frequencies, and one does not need the detail provided by a complete normal mode calculation. Even if a normal mode calculation is desired, the computation time can be reduced considerably if the mode wavenumbers can be estimated in advance. In such a case, the WKB method can be used to obtain formulate which, although they are approximate, are given in closed form. In this paper formulae based on exact and WKB solutions are presented for the number of modes trapped in some simple sound channels and for the wave numbers and cutoff frequencies associated with these modes. The number of trapped modes is shown to depend on the gross features of the sound channel, while the distribution of modal wave numbers depends to a greater degree on the details of the sound speed profile shape.
Author (GRA)

N83-27799# Naval Postgraduate School, Monterey, Calif.
COMPUTERIZED MEASUREMENT AND TRACKING OF ACOUSTICAL RESONANCES M.S. Thesis
Donald Vincent Conte Dec. 1982 38 p refs
(AD-A125286) Avail: NTIS HC A03/MF A01 CSCL 20/1

A system is described which incorporated a Hewlett-Packard 85 desk-top computer to control a frequency synthesizer and read the output of a lock-in analyzer to measure, display and record the resonant frequencies, amplitudes, and quality factors of several modes of an acoustical resonator. The system is capable of locating, measuring, and tracking the resonant modes as parameters which affect sound speed and attenuation are varied. An algorithm for rapidly fitting good quality measured data to a resonance lineshape is described which determines quality factors to precisions of better than 0.1 percent, amplitudes to better than 0.01 percent and center frequencies to better than 0.1 ppm. Sample output is provided for the lowest three plane-wave modes of an air filled cylindrical resonator in the temperature range of -15 to 25 degrees Celsius. Author (GRA)

N83-27800# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Mathematical Sciences.
SENSITIVITY TO SOUND SPEED OF SURFACE/BOTTOM REFLECTING TRANSMISSIONS IN A DEEP OCEAN CHANNEL
W. L. Siegmann, M. J. Jacobson, and P. Bilazarian 1 Feb. 1983 60 p refs
(Contract N00014-76-C-0288)
(AD-A125278; RPI-MATH-136) Avail: NTIS HC A04/MF A01 CSCL 20/1

The sensitivity of oceanic sound transmissions to the choice of a sound-speed profile is analyzed using ray theory. The profile may be selected from a large depth-dependent collection which models the deep ocean sound channel. Sound propagation is examined between fixed source and receiver, both close to horizontal ocean boundaries, for ranges up to about 50 km. Given a specified profile, procedures are prescribed for constructing a second, simpler profile so that important acoustic quantities are virtually identical. The construction methods are easy to apply, have physical interpretation, and identify the critical aspects of profile data which influence transmissions. The ray geometries associated with the two profiles are shown to be very close. Useful formulas are derived which demonstrate that per-ray and total-field phases and amplitudes corresponding to the simpler profile approximate accurately those of the specified profile. Schemes are presented for determining range intervals for replacement of the given profile, based on specified tolerances for phase and amplitude differences. Thus, when our procedure is applied, propagation results are not sensitive to the type of profile selected. Author (GRA)

N83-27801# Flying Training Wing (323d), Mather AFB, Calif. Environmental Planning Sect.
AICUZ (AIR INSTALLATION COMPATIBLE USE ZONE) REPORT Progress Report, 5 Jan. 1978 - Aug. 1982
Sep. 1982 103 p
(AD-A124974) Avail: NTIS HC A06/MF A01 CSCL 20/1

The development and use of lands near U.S. Air Force base is of continuing concern to Air Force officials. It is recognized that the public must be protected from noise and other hazards of air base operations. At the same time it is recognized that lands near air bases often are highly attractive areas for development. Aircraft operations are likely to continue from Mather AFB for the indefinite future. Operations will include the T-37, T-43, B-52, KC-135 or replacement aircraft. The types of aircraft, flight tracks, frequency, and other characteristics will be continuously evaluated by Mather AFB to determine the effects on the AICUZ and the community. The AICUZ study was prepared to promote orderly and compatible land use around Mather AFB. Land use guidelines and noise measurement techniques are based on recent technology. Data from this study should be considered for incorporation into existing land use plans and ordinances of surrounding communities, and used as a basis for decisions on future land development requests. GRA

N83-27802# Washington Univ., Seattle.
USE OF ANALYTICAL MECHANICS IN DEFINING ACOUSTIC-TEST METHODOLOGY
A. F. Emergy and G. H. Thomas (Sandia Labs., Livermore, Calif.) Jun. 1982 33 p refs
(Contract DE-AC04-76DP-000789)
(DE82-018615; SAND-82-8223) Avail: NTIS HC A03/MF A01

One of the more pressing needs is the ability to measure the level of stress in materials due either to active loading or to the residual strains caused by plastic deformation. Acoustic techniques have not been exploited on a routine testing basis for stress determination because their use requires not only very sophisticated instrumentation, but also because they are difficult to automate and require laborious and delicate personal operation. However, the development of small, inexpensive micro and minicomputes which can be dedicated to single tasks offers the possibility of designing acoustic nondestructive evaluation (ANDE) procedures which will be accurate, reasonably priced and for which the computer may provide automated testing and data processing. A number of different ANDE measurements can be made, but the problem is to define their sensitivity and accuracy in order to choose one or more which are useful in a production sense. DOE

N83-27803# Sandia Labs., Albuquerque, N. Mex. Facility Systems Engineering Div.
SANDIA HELICOPTER ACOUSTIC DETECTOR (SHAD)
H. Duane Arlowe May 1982 12 p refs
(Contract DE-AC04-76DP-00789)
(DE82-018925; SAND-81-0538) Avail: NTIS HC A02/MF A01

The Sandia Helicopter Acoustic Detector was developed to provide a low cost alternative to radar for countering the helicopter threat at new DOE facilities: The main buildings of these new designs are generally hardened to provide significant delay to a helicopter borne adversary team. Under these circumstances the sensor is only required to detect helicopters that are in their final landing phase and at close range (less than 75 m). This short detection range allows the use of a fairly simple acoustic detection algorithm without making the system overly sensitive to wind noise, motor vehicles, and ventilation/heat exchange blowers. This work was sponsored by the Department of Energy/Office of Safeguards and Security as part of the overall Sandia Fixed Facility Physical Protection Program. DOE

N83-27804# Pacific Northwest Lab., Richland, Wash.
ULTRASONIC SYSTEM CHARACTERIZATION
L. J. Busse, F. L. Becker, R. E. Bowey, S. R. Doctor, R. P. Gribble, and G. J. Posakony 1982 4 p refs Presented at the 5th Intern. Conf. on Quantitative NDE in the Nucl. Ind., San Diego, Calif., 10 May 1982
(Contract DE-AC06-76RL-01830)
(DE82-019210; PNL-SA-10428; CONF-820563-7) Avail: NTIS HC A02/MF A01

The need for standardized and reproducible ultrasonic test system performance is well known. Here reproducible means that results obtained must be repeatable from day-to-day and also more broadly, test procedures should be repeatable at many different locations by different personnel. This can be accomplished only if the performance characteristics of the test systems are well known. Methods for characterization of ultrasonic systems are presented. The total instrument system is considered as three separate components consisting of a transmitter/pulser, transducer including cable, and receiver-display section. The operation of each component is assessed independently. The measurements are, for the most part, performed using a desk-top calculator and plotter which can produce finished four color data sheets. The results of evaluations of commercially available ultrasonic instruments and transducers are presented. DOE

N83-27805# Sandia Labs., Albuquerque, N. Mex.
ACOUSTIC EMISSIONS DURING DEFORMATION OF INTACT AND JOINTED WELDED TUFF
David J. Holcomb and Lawrence W. Teufel Jul. 1982 41 p refs
(Contract DE-AC04-76DP-00789)
(DE82-018346; SAND-82-1003) Avail: NTIS HC A03/MF A01

Monitoring of acoustic emissions (AE) has been widely used as a means of detecting failure in intact rock. For intact rock the technique is simple, because an increasing rate of AE is usually a sign of impending failure. However, most large rock masses contain numerous joints and the behavior of the joints controls the properties of the rock mass In particular, the failure mode often becomes stable or unstable slip (stick-slip) on a joint at stresses well below those required for failure of the intact rock. As an aid to understanding and monitoring the behavior of jointed rock masses, we have done a series of experiments on intact and artificially jointed samples of Grouse Canyon tuff. The tuff was selected because it is under consideration as a disposal medium for nuclear wastes. The samples were instrumented to measure axial and transverse displacements and AE rates. DOE

N83-27806# Illinois Univ., Urbana. Lab. for Materials Research.
LOW-TEMPERATURE ULTRASONIC ATTENUATION IN RAPIDLY COOLED NIOBIUM CONTAINING OXYGEN AND HYDROGEN

K. F. Huang, A. V. Granato, and H. K. Birnbaum 1982 6 p refs Presented at the Intern. Symp. on the Electronic Structure and Properties of Hydrogen in Metals, Richmond, 4 Mar. 1982
(Contract DE-AC02-76ER-01198)
(DE82-012717; DOE/ER-01198/1377; CONF-820325-9) Avail: NTIS HC A02/MF A01

Measurements of ultrasonic attenuation and velocity in dilute Nb-O-H alloys were made as a function of temperature, frequency, polarization, annealing temperature, isotope, and defect concentration. In addition to the stable 2.5 K relaxation peak found earlier an additional peak at 6.3 K at 10 MHz was found when the specimen was rapidly cooled to He temperature. It is concluded that peak 2 at 6.3 K arises from an OH complex. The simplest interpretation is that it represents an OH2 complex. In a slow cooling process, one oxygen traps only one hydrogen and this OH pair is rather stable. In a rapid cooling process, some of the oxygen traps more than one hydrogen, forming OH2. However, the second hydrogen is less strongly bound than the first. During annealing, detrapping of one of the two hydrogens occurs and an OH2 becomes an OH with freed hydrogen going into precipitates. DOE

N83-27807# Research Inst. of National Defence, Linkoeping (Sweden). Dept. 3.
EQUIPMENT FOR RECORDING THE DIRECTION OF INCIDENCE OF INFRASONIC SOUND WAVES. TECHNICAL DESCRIPTION
Hans-Goeran Nygren Jan. 1983 59 p refs In SWEDISH; ENGLISH summary
(FOA-C-30307-E1) Avail: NTIS HC A04/MF A01

Stationary equipment for recording atmospheric sound signals is described. The equipment consists of three microphones, a signal processor and a microcomputer. The set-up is dimensioned for narrow band detection at 2 HZ. Examples of recordings are presented. Protection against lightning and environmental influences are outlined. Author (ESA)

N83-27808# United Kingdom Atomic Energy Authority, Harwell (England). Materials Physics Div.
ULTRASONIC WAVE ATTENUATION SPECTRA IN STEELS
W. N. Reynolds and R. L. Smith Jan. 1983 20 p refs
(AERE-R-10753) Avail: NTIS HC A02/MF A01

Recent work on well characterized iron carbon alloys has shown that the attenuation characteristics of high frequency ultrasonic waves depend on the mean grain size, the grain size distribution and on a damping term that has been associated with dislocations. Methods of analysis of the attenuation spectra are presented which offer the possibility of isolating each of these parameters so that their separate influence on mechanical properties can be investigated. Some typical results on particular alloys are presented to illustrate the analysis. Author

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N83-27809*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
RATE PROCESSES IN GAS PHASE
C. Frederick Hansen May 1983 263 p refs
(NASA-RP-1090; A-8817; NAS 1.61:1090) Avail: NTIS HC A12/MF A01 CSCL 20H

Reaction-rate theory and experiment are given a critical review from the engineers' point of view. Rates of heavy-particle, collision-induced reaction in gas phase are formulated in terms of the cross sections and activation energies for reaction. The effect of cross section function shape and of excited state contributions to reaction both cause the slope of Arrhenius plots to differ from the true activation energy, except at low temperature. The master equations for chemically reacting gases are introduced, and dissociation and ionization reactions are shown to proceed primarily from excited states about kT from the dissociation or ionization limit. Collision-induced vibration, vibration-rotation, and pure rotation transitions are treated, including three-dimensional effects and conservation of energy, which have usually been ignored. The quantum theory of transitions at potential surface crossing is derived, and results are found to be in fair agreement with experiment in spite of some questionable approximations involved. Author

N83-27810# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A LOCAL SINGLE PARTICLE SELF ENERGY FOR THE HUBBARD MODEL
Ram Kishore May 1983 18 p refs Submitted for publication
(INPE-2736-PRE/316) Avail: NTIS HC A02/MF A01

A local single particle self energy is proposed for the Hubbard model and the density of states is calculated by using a rectangular form for the bare electron density of states. In appropriate limits, this self energy reproduces the results of Hartree-Fock, and of the Hubbard first, and third approximations. For a half filled band, it shows the possibility of a discontinuous metal-nonmetal transition. For a more than half filled band, a satellite peak below the Fermi energy was found in the photo-emission spectra of the transition metals. Author

N83-27811# Naval Postgraduate School, Monterey, Calif.
INSTRUMENTAL PHOTON ACTIVATION ANALYSIS USING THE LINEAR ACCELERATOR AT THE NAVAL POSTGRADUATE SCHOOL M.S. Thesis
Wayne Alan Fisher Oct. 1982 108 p refs
(AD-A125003) Avail: NTIS HC A06/MF A01 CSCL 07/4

Charcoal, charcoal residue, potting soil, aluminum foil, bismuth germanate, and petroleum samples have been investigated using instrumental photon activation analysis (i.e., no radiochemistry). The major and minor elements routinely observed by this nondestructive method were: C, C1, Ca, Fe, Mg, Si, and K. A comprehensive review of the principles of IPAA was also included in the study. The principles were applied to a theoretical analysis of an oil sample in which the trace element concentrations were known. It was concluded that IPAA is a highly sensitive technique which could be used to fingerprint oils. Author (GRA)

N83-27812# Los Alamos Scientific Lab., N. Mex.
PROCEEDINGS OF THE LOS ALAMOS NEUTRINO WORKSHOP
F. Boehm, comp. and G. J. Stephenson, Jr., comp. 1981 97 p Workshop held in Los Alamos, N. Mex., 8-12 Jun. 1981
(DE83-000427; LA-9358-C) Avail: NTIS HC A05/MF A01

Several areas of neutrinophysics are addressed including: particle physics, nuclear physics, cross sections, flux calculations, detectors, cost and facilities, and pulsed beams. DOE

N83-27813# Stanford Linear Accelerator Center, Calif.
PHOTON-PHOTON COLLISIONS
David L. Burke Oct. 1982 12 p refs Presented at the 21st Intern. Conf. on High Energy Phys., Paris, 26-31 Jul. 1982
(Contract DE-AC03-76SF-00515)
(DE83-007011; SU-SLAC-PUB-2988; CONF-820718-29) Avail: NTIS HC A02/MF A01

Studies of photon-photon collisions are reviewed with particular emphasis on results reported on light meson spectroscopy and deep inelastic e(BETA) scattering. Considerable work has now been accumulated on resonance production by gamma gamma collisions. Preliminary high statistics studies of the photon structure function F2/sup gamma (x,sq O) are given and comments are made on the problems that remain to be solved. DOE

N83-27814# Sandia Labs., Albuquerque, N. Mex.
RETENTION AND RECYCLING OF PLASMA-EDGE HYDROGEN ISOTOPES IN C AND TiC
David K. Brice, Barney L. Doyle, William R. Wampler, Samuel T. Picraux, and L. G. Haggmark Jun. 1982 26 p refs
(Contract DE-AC04-76DP-00789)

(DE82-019959; SAND-82-0821) Avail: NTIS HC A03/MF A01

The retention, release, and isotopic exchange of hydrogen, deuterium, and tritium incident on room temperature C and TiC with Maxwellian velocity and isotropic angular distributions have been calculated using the Local Mixing Model. The calculations are based on the hydrogen saturation concentration, range distributions and isotropic exchange behavior, all of which have been verified experimentally by monoenergetic implants. Particle fluences and characteristic Maxwellian energies were chosen in the range of interest for tokamak plasma edge conditions. The results of these calculations can be used to estimate tritium inventory buildup and to predict tritium changeout rates by isotopic exchange as a function of plasma edge conditions. DOE

N83-27815# Oak Ridge National Lab., Tenn.
EMISSION OF HIGH-ENERGY, LIGHT PARTICLES FROM INTERMEDIATE-ENERGY HEAVY-ION REACTIONS
J. B. Ball and R. L. Auble 1982 15 p refs Presented at the 2nd Indo-U.S. Joint Symp. on Nucl. Phys. at Cyclotron and Intermediate Energy, Bombay, 24-28 May 1982
(Contract W-7405-eng-26)
(DE82-017403; CONF-820588-2) Avail: NTIS HC A02/MF A01

One of the early surprises in examining reaction products from heavy ion reactions at 10 MeV/nucleon and above was the large yield of light particles emitted and the high energies to which the spectra of these particles extended. The interpretation of the origin of the high energy light ions has evolved from a picture of projectile excitation and subsequent evaporation to one of pre-equilibrium (or nonequilibrium) emission. The time scale for particle emission has thus moved from one that occurs following the initial collision to one that occurs at the very early stages of the collision. Research on this phenomenon is reviewed. DOE

N83-27816# Oak Ridge Associated Universities, Tenn.
LASER MEASUREMENTS AND NUCLEAR STRUCTURE
G. A. Leander 1982 9 p refs Presented at the Conf. on Lasers in Nucl. Phys., Oak Ridge, Tenn., 21-23 Apr. 1982
(Contracts W-7405-eng-26; DE-AC05-76QR-00033)
(DE82-017528; CONF-820428-7) Avail: NTIS HC A02/MF A01

The nuclear states amenable to laser studies are reviewed with respect to their structure. Systematic predictions are made, e.g., for magnetic moments of parity mixed intrinsic orbitals in the Ac isotopes and for the shape of the known high spin isomers in the Pb region. DOE

N83-27817# Oak Ridge National Lab., Tenn.
LASER-OPTICAL STUDIES OF THE SPONTANEOUS-FISSION ISOMER /SUP 240m/Am
J. R. Beene, C. E. Bemis, Jr., S. D. Kramer, and J. P. Young 1982 11 p refs Presented at the Conf. on Lasers in Nucl. Phys., Oak Ridge, Tenn., 21 Apr. 1982
(Contract W-7405-eng-48)
(DE82-017433; CONF-820428-9) Avail: NTIS HC A02/MF A01

Improved optical pumping experiments on the (240m) Am fission isomer were performed using the laser induced nuclear polarization (LINUP) technique. Results of these experiments are discussed in terms of the constraints they place on the spectroscopic properties of (240m) Am. In addition, a quantitative analysis of the isomer shift in terms of nuclear shape is undertaken making use of recent muonic X-ray data on (241) Am and (243) Am. DOE

N83-27818# Oak Ridge National Lab., Tenn.
THE INCORPORATION OF PARTICLE COLLISIONS IN THE TIME-DEPENDENT HARTREE-FOCK APPROXIMATION
Cheuk-Yin Wong 1982 22 p refs Presented at the Intern. Symp. on Time-Dependent Hartree-Fock and Beyond, Bad Honnef, West Germany, 7-11 Jun. 1982
(Contract W-7405-eng-26)
(DE82-017481; CONF-820654-2) Avail: NTIS HC A02/MF A01

Previously, the extended time-dependent Hartree-Fock (ETDHF) approximation was extended to include particle collisions in terms of a temporal variation of the occupation probability n sub lambda for the single-particle states. In the simplest approximation, the single-particle potential is modified only through the particle density which depends on n sub lambda. The extended TDHF approximation was refined by studying how particle collisions affect the single-particle potential. It was found that it acquires two second-order contributions which are state-dependent and are the generalization of the core polarization and correlation contributions one encounters in the study of the nucleon-nucleus optical potentials. In consequence, concepts such as energy-dependent single-particle potentials and effective masses may be properly introduced in the extended TDHF approximation. Also, the conservation of energy in the ETDHF approximation is reviewed. The total energy should include a second-order contribution due to correlations arising from particle collisions. DOE

N83-27819# Oak Ridge National Lab., Tenn.
FOLDING MODELS FOR ELASTIC AND INELASTIC SCATTERING
G. R. Satchler 1982 20 p refs Presented at the Intern. Summer School on Heavy Ion Collisions, Huelva, Spain, 7-19 Jun. 1982 Submitted for publication
(Contract W-7405-eng-26)
(DE82-017426; CONF-820663-2) Avail: NTIS HC A02/MF A01

The most widely used models are the optical model potential (OMP) for elastic scattering, and its generalization to nonspherical shapes, the deformed optical model potential (DOMP) for inelastic scattering. These models are simple and phenomenological; their parameters are adjusted so as to reproduce empirical data. Nonetheless, there are certain, not always well defined, constraints to be imposed. The potential shapes and their parameter values must be reasonable and should vary in a smooth and systematic way with the masses of the colliding nuclei and their energy. One way of satisfying these constraints, without going back to a much more fundamental theory, is through the use of folding models. Folding procedures allow us to incorporate many aspects of nuclear structure as well as theoretical ideas about the effective interaction of two nucleons within nuclear matter. Folding model potentials, single folded potentials, and the double folding model including applications to heavy ion scattering are discussed. DOE

N83-27820# California Univ., Berkeley. Lawrence Berkeley Lab. Nuclear Science Div.
THE ROLE OF ROTATIONAL DEGREES OF FREEDOM IN HEAVY-ION COLLISIONS
Luciano G. Moretto Apr. 1982 15 p refs Presented at the Intern. Conf. on Selected Heavy Ion Rections, Saclay, France, 3 May 1982
(Contract W-7405-eng-48)
(DE82-015751; LBL-14283; CONF-820536-2) Avail: NTIS HC A02/MF A01

The degrees of freedom affected by the angular momentum are identified. The relevance of the equilibrium fluctuations in a diffusive evolution of the system is discussed. The statistical limit is described and chosen as a reference for comparing with experiment. The rigid rotation regime is shown to be reached in a variety of reactions. The fragment spin alignment is measured from gamma ray multiplicities and anisotropies as well as from sequential fission angular distributions. Good agreement is obtained with the statistical model for the P sub zz component of the polarization tensor. The P sub xy component seems also to reach the statistical limit at large Q-value. The effect of shells on the angular momentum transferred to the fragments and on its misalignment is discussed theoretically and specific predictions are made. DOE

N83-27821# Sandia Labs., Albuquerque, N. Mex. Pulsed Power Applications Dept.
HIGH-AVERAGE-POWER ELECTRON ACCELERATORS FOR GENERATING GIGAWATT MICROWAVE PULSES
K. R. Prestwich and G. J. Rohwein 1983 9 p refs Presented at the 2nd Natl. Conf. on High Power Microwave Technol., Adelphi, Md., 1 Mar. 1983
(Contract DE-AC04-76DP-00789)
(DE83-006808; SAND-82-2900C; CONF-830314-1) Avail: NTIS

HC A02/MF A01

High power, relativistic electron beams can be efficiently converted to microwaves. A conceptual design of a portable 700 kV, 10 ka, 100 ns, 100 Hz electron beam accelerator that could be the energy source for a relativistic magnetron or backward wave oscillator is described. The design consists of a capacitor, a compact, high-voltage transformer, a PFN, spark gaps, and an electron beam diode. Prime power systems suitable for powering such a device are also considered. DOE

N83-27822# Fermi National Accelerator Lab., Batavia, Ill.
REMARKS ON FUTURE ACCELERATORS AND FUTURE PHYSICS
J. D. Bjorken Sep. 1982 9 p refs Presented at the European Comm. of Future Accelerators, the Challenge of Ultra-High Energies Conf., Oxford, Eng., 27-30 Sep. 1982
(Contract DE-AC02-76CH-03000)
(DE83-006643; FERMILAB-CONF-82/77-THY; CONF-820980-4) Avail: NTIS HC A02/MF A01

Speculations are given on the future of high energy accelerators. DOE

N83-27823# Battelle Pacific Northwest Labs., Richland, Wash.
IONIZATION BY FAST CHARGED PARTICLES
L. H. Toburen, R. D. DuBois, W. E. Wilson, and J. H. Miller Apr. 1982 6 p refs Presented at the 15th Ann. Radiological Phys. Contractors Meeting, Gettysburg, Pa., 4 May 1982
(Contract DE-AC06-76RL-01830)
(DE82-014849; PNL-SA-10392; CONF-82075-1) Avail: NTIS HC A02/MF A01

To determine the initial interaction of radiation with biological models, differential ionization cross sections are being studied to determine the differential in the energy and angular distribution of ejected electrons. Low energy electron emission spectra are being measured using time-of-flight spectrometers. Bethe-Borne theory is being applied to the interpretation of the low energy electron spectra. Total ionization yields are being measured emphasizing accuracy and involving a wide range of ion and proton energies from 5 keV to 4 MeV. Alpha particles and carbon ions and the degree of ionization and molecular fragmentation which results from charged particle collisions with atomic and molecular targets are also being investigated. A.R.H.

N83-27824# Los Alamos Scientific Lab., N. Mex.
LAMPF TRANSITION REGION
Oscar R. Sander Jun. 1982 46 p refs
(Contract W-7405-eng-36)
(DE82-019489; LA-9315-MS) Avail: NTIS HC A03/MF A01

After describing the transition region beween the LAMPF drift tube linac and side coupled linac, the function of the region, its present shortcomings, and the need for a redesign are discussed. Then the new design, its advantages, and its expected performance are presented. Included are detailed results of beam dynamics studies giving the ranges of input and output beam shapes that can be successfully matched in the new transition region. To improve the present operation of the two linacs, small changes are suggested that allow one to easily match the beam between the two linacs. Finally, the methods used in beam dynamic studies are described so that effects of future improvements to the new design can be examined. DOE

N83-27825# Sandia Labs., Albuquerque, N. Mex.
BEAM BROADENING IN A STRONGLY SCATTERING TARGET IN THE ANALYTICAL ELECTRON MICROPSCOPE
A. D. Romig, Jr., D. E. Newbury (NBS, Washington, D.C.), and R. L. Myklebust (NBS, Washington, D.C.) 1982 16 p refs
(Contract DE-AC04-76DP-00789)
(DE82-014085; SAND-82-08680) Avail: NTIS HC A02/MF A01

Beam broadening has been studied in alloys of uranium-niobium and uranium-molybdenum. Profiles have been measured across interphase boundaries for which the solute element is located exclusively in one phase. Experimental measurements have been compared with calculated profiles obtained with a Monte Carlo electron trajectory simulation. Good agreement is obtained in the immediate region of the boundary. A long, low intensity tail is indicated by the calculations but this tail is not observed experimentally. Studies of the effect of varying specimen and beam parameters indicate the difficulty in obtaining accurate experimental profiles. Uncertainties on the order of + or - 10% in these parameters produce measurable effects. DOE

N83-27826# Mound Lab., Miamisburg, Ohio.
GAMMA-RAY FOR SIMULTANEOUS CALORIMETRIC ASSAY
D. A. Rakel 2 Mar. 1982 10 p refs
(Contract DE-AC04-76DP-00053)
(DE82-008615; MLM-2898) Avail: NTIS HC A02/MF A01

Gamma ray measurements obtained in the course of developing a simultaneous calorimetric assay system are described. Gamma ray measurements of the isotopic composition of six, well characterized plutonium oxide samples were obtained while the samples were in the calorimeter. These samples represent a range of plutonium masses from 19 to 231 g and two isotopic composition. The values of effective specific power determined from the gamma ray measurements agree with the values determined from destructive assay. DOE

N83-27827# Argonne National Lab., Ill.
NOTE ON THE ELASTIC-SCATTERING OF FEW-MeV NEUTRONS FROM ELEMENTAL CALCIUM
A. B. Smith and P. T. Guenther Mar. 1982 21 p refs
(Contract W-31-109-eng-38)
(DE82-019476; ANL/NDM-65) Avail: NTIS HC A02/MF A01

Neutron differential elastic scattering cross sections of elemental calcium are measured from < 1.5 to 4.0 MeV at intervals of approximately 50 to 100 keV. Scattering angles are distributed between 20 and 160 deg. Incident neutron energy resolutions are approximately 50 to 100 keV. The experimental results are compared with values given in ENDF/B-V and are examined in the context of shielding applications. An optical potential is deduced from the measured values and its possible implications are discussed. DOE

N83-27828# Los Alamos Scientific Lab., N. Mex. Theoretical Div.
THE GAMOW-TELLER STRENGTH FUNCTIONS AND NEUTRINO PROBLEMS
W. C. Haxton 1982 24 p refs Presented at Intern. Conf. on Spin Excitation in Nuclei, Telluride, Color., 25 Mar. 1982
(Contract W-7405-eng-36)
(DE82-018357; LA-UR-82-1627; CONF-820357-4) Avail: NTIS HC A02/MF A01

A quantitative understanding of spin strengths in nuclei is of vital importance in studies of nuclear double beta decay and in solar neutrino spectroscopy. The current status of these problems is outlined. DOE

N83-27829# Stanford Linear Accelerator Center, Calif.
HUNT FOR THE 1(1)P SUB 1 BOUND STATE OF CHARMONIUM
F. C. Porter Feb. 1982 6 p refs
(Contracts DE-AC03-76SF-00515; DE-AC03-81ER-40050)
(DE82-009520; SU-SLAC-Pub-2881; CALT-68-899; CONF-820143-1) Avail: NTIS HC A02/MF A01

The Crystal Ball detector at SPEAR was used to look for evidence of the isospin-violating decay psi' yields pi(01)P sub 1 where (1)P sub 1 is the predicted spin-singlet p-wave bound state of charmonium. For a (1)P sub 1 state at the predicted mass (3520 MeV), the 95% confidence level limits are BR (psi yields pi(01)P1)< 0.55%, BR(psi' yields pi(01)P sub 1)BR((1)P sub 1 yields gamma n sub c < 0.14%). These limits are compared with simple theoretical predictions. DOE

N83-27830# Rockefeller Univ., New York.
DIFFRACTIVE INTERACTIONS OF HADRONS AT HIGH ENERGIES
K. Goulianos 1982 80 p refs Presented at 21th Internatl. Conf.

on High Energy Energy Phys., Paris, 29 Jul. 1982
(Contract DE-AC02-81ER-40033)
(DE82-019463; DOE/ER-40033/24; CONF-820718-4) Avail: NTIS HC A05/MF A01

Elastic scattering inclusive single diffraction dissociation and total cross section results are reviewed, with emphasis on the interrelationship among the parameters that characterize these processes. DOE

N83-27831# California Univ., Livermore. Lawrence Livermore Lab.
ATOMISTIC NONEQUILIBRIUM COMPUTER SIMULATIONS
W. G. Hoover 1 Jun. 1982 28 p refs Presented at Nonlinear Fluid Dyn. Conf., Boulder, Colo., 7 Jun. 1982
(Contract W-7405-eng-48)
(DE82-017551; UCRL-87690; CONF-820670-1) Avail: NTIS HC A03/MF A01

Newton's, Lagrange's and Hamilton's equations of motion were modified to include the effects of constraints, nonequilibrium fluxes, and gradients. These nonclassical equations provide estimates of the linear transport coefficients and, through nonlinear dissipative terms, can also simulate nonequilibrium steady states. To illustrate the modified equations of motion, they are applied to a simple three oscillator problem. The new methods were used to study nonlinear problems with large coupled gradients. We describe two examples: the coupling of heat flow with rotation and the simulation of strong shockwaves in dense fluids. DOE

N83-27832# Sandia Labs., Albuquerque, N. Mex.
ANALYSIS OF ELECTRONIC DESORPTION
D. R.. Jennison 1982 6 p refs Presented at Desorption Induced by Electron. Transitions Conf., Williamsburg, Va., 12 May 1982
(Contract DE-AC04-76DP-00789)
(DE82-018591; SAND-82-1667C) Avail: NTIS HC A02/MF A01

An analysis of the desorption process in time is presented. Especially discussed are the roles of correlation in multi-particle excitations and of the strain induced localization of excitations in periodic systems. DOE

N83-27833# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
INVESTIGATION OF THE POTENTIAL FUNCTIONS OF WEAKLY BOUND DIATOMIC MOLECULES AND LASER-ASSISTED EXCITIVE PENNING IONIZATION Ph.D. Thesis
James H. Goble, Jr. May 1982 275 p refs
(Contract W-7405-eng-48)
(DE82-017259; LBL-14278) Avail: NTIS HC A12/MF A01

Three variations on the Dunham series expansion function of the potential of a diatomic molecule are compared. The difference among these expansions lie in the choice of the expansion variable. A wide selection of molecular systems are examined. It is found that, for potentials in excess of thirty kcal/mole, the Huffaker expansion provides the best description of the three, extrapolating at large internuclear separation to a value within 10% of the true dissociation energy. For potentials that result from the interaction of excited states, all series expansions show poor behavior away from the equilibrium internuclear separation of the molecule. The series representation of the potentials of weakly bound molecules are examined in more detail. The ground states of BeAr(+), HeNe(+), NaAr, and Ar2 and the excited states of HeNe(+), NaNe, and NaAr are best described by the Thakkar expansion. Finally, the observation of laser assisted excitive Penning ionization in a flowing afterglow is reported. DOE

N83-27834# Los Alamos Scientific Lab., N. Mex.
MUON SPIN-ROTATION STUDY ON MAGNETITE
C. Boekema, V. A. M. Brabers, A. B. Denison, R. H. Heffner, R. L. Hutson, M. Leon, C. E. Olsen, and M. E. Schillaci 1982 9 p refs Presented at ICM Conf., Kyoto, Japan, 6 Sep. 1982
(Contract W-7405-eng-36)
(DE82-019535; LA-UR-82-2265; CONF-820929-1) Avail: NTIS HC A02/MF A01

Muon spin-rotation results on synthetic single crystals of magnetite Fe3O4 support the idea of muon bond formation in oxides. The anomaly in the temperature dependence of the muon spin-rotation signal observed in Fe3O4 may be attributed to the existence of molecular polarons in the verwey transition-temperature region. DOE

N83-27835# Massachusetts Inst. of Tech., Oak Ridge, Tenn. School of Chemical Engineering Practice.
ION-EXCHANGE BEHAVIOR OF ALKALI METALS ON TREATED CARBONS
G. Mohiuddin, W. Y. Hata, and J. S. Tolan Jan. 1983 64 p refs
(Contract W-7405-eng-26)
(DE83-005980; ORNL/MIT-351) Avail: NTIS HC A04/MF A01

The ion exchange behavior of trace quantities of the alkali metal ions sodium and cesium, on activated carbon impregnated with zirconium phosphate (referred to here as ZrP), was studied. Impregnated carbon had twice as much ion exchange activity as unimpregnated, oxidized carbon, and 10 times as much as commercial activated carbons. The distribution coefficient of sodium increased with increasing pH; the distribution coefficient of cesium decreased with increasing pH. Sodium and cesium were separated with an electrolytic solution of 0.1 M HCl. Preliminary studies indicated that 0.2 M potassium and cesium can also be separated. Distribution coefficients of the supported ZrP were determined by the elution technique and agreed within 20% of the values for pure ZrP calculated from the literature. DOE

N83-26810# Air Force Aero Propulsion Lab., Wright-Patterson AFB, Ohio.
THERMAL DISSOCIATION OF DIATOMIC MOLECULES Final Report
W. F. Bailey and A. Garscadden *In* AFWAL A Collection of Papers in the Aerospace Sci. Jun. 1982 p 634-641 refs (For primary document see N83-26787 16-01)
Avail: NTIS HC A99/MF A01 CSCL 20/8

N83-27698# Nara Women's Univ. (Japan). Dept. of Physics.
STOPPING POWERS OF Zr, Pd, Cd, In AND Pb FOR 6.5 MeV PROTONS AND MEAN EXCITATION ENERGIES
R. Ishiwari, N. Shiomi, and N. Sakamoto *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 1-12 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

N83-27699# Nara Women's Univ. (Japan). Dept. of Physics.
GEOMETRICAL EFFECT ON STOPPING POWER MEASUREMENT (ANGLE DEPENDENT ENERGY LOSS) OF 7 MeV PROTONS
R. Ishiwari, N. Shiomi, and N. Sakamoto *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 13-22 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

N83-27700# Nara Women's Univ. (Japan). Dept. of Physics.
COMPUTER SIMULATION OF GEOMETRICAL EFFECTS ON THE STOPPING POWER FOR 7 MeV PROTONS
N. Sakamoto, N. Shiomi, and R. Ishiwari *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 23-30 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

N83-27701# Montana Univ., Missoula. Dept. of Physics and Astronomy.
CURRENT STOPPING POWER ANALYSES
L. E. Porter *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 31-45 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

N83-27702# Waseda Univ., Tokyo (Japan). Lab. for Science and Engineering Research.
STOPPING POWER OF Ni, Ag, Au AND Pb FOR APPROXIMATELY 7 MeV/n ALPHA-PARTICLES AND CARBON IONS (Z 3/1 PROPORTIONAL DEVIATION FROM THE BETHE

FORMULA)
Tadayoshi Doke and Tan Takahashi (Inst. for Physical and Chemical Research) *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 46-56 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

N83-27703# National Bureau of Standards, Washington, D.C. Center for Radiation Research.
MEAN EXCITATION ENERGIES FOR USE IN BETHE'S STOPPING-POWER FORMULA
M. J. Berger and S. M. Seltzer *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 57-74 refs Sponsored in part by ONR (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

N83-27704# Tokyo Univ. (Japan). Coll. of General Education.
INNER-SHELL IONIZATION AND STOPPING POWER
K. Komaki *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 75-77 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

N83-27705# Naval Surface Weapons Center, White Oak, Md.
PERTURBED STATIONARY-STATE DESCRIPTION OF THE POLARIZATION EFFECT IN INNERSHELL IONIZATION
George Basbas (Physical Review Letters) and David J. Land *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 78-87 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

N83-27706# International Business Machines Corp., Yorktown Heights, N. Y.
EMPIRICAL STOPPING POWERS FOR IONS IN SOLIDS
J. F. Ziegler, J. P. Bjersack, and U. Littmark *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 88-100 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

N83-27707# Tokyo Univ. (Japan). Coll. of General Education.
STOPPING POWER OF RARE GASES IN AMORPHOUS SILICON FOR MeV HELIUM IONS
F. Fujimoto, K. Komaki, A. Optuka, K. Kawatsura, K. Ozawa, T. Shimada (Hitachi Central Research Lab.), and Y. Katayama (Hitachi Central Research Lab.) *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 101-107 refs Prepared in cooperation with JAERI (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

N83-27708# Oak Ridge National Lab., Tenn. Health and Safety Research Div.
THE STOPPING POWER OF AN ELECTRON GAS FOR SLOW IONS
R. H. Ritchie *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 108-114 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

N83-27711# Atomic Energy of Canada Ltd., Chalk River (Ontario). Nuclear Labs.
ENERGY LOSS OF HEAVY IONS AS A FUNCTION OF TARGET THICKNESS: Ne YIELDS C
W. N. Lennard, H. R. Andrews, I. V. Mitchell, D. Phillips, and D. Ward *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 136-148 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

N83-27712# Waseda Univ., Tokyo (Japan). Lab. for Science and Engineering Research.
ESTIMATION OF FLUCTUATION IN RESTRICTED ENERGY LOSS
Tadayoshi Doke, Takayoshi Hayashi, and Katsuaki Nagata (Tamagawa Univ.) *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 149-154 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

N83-27713# Oak Ridge National Lab., Tenn. Health and Safety Research Div.
ENERGY LOSSES TO SURFACE PLASMONS BY CHARGED PARTICLES
R. H. Ritchie and J. C. Ashley *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 164-166 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

N83-27714# Physical Review Letters, Ridge, N.Y.
STOPPING OF SWIFT IONS IN CONDENSED MATTER: THE THEORY OF EFFECTIVE CHARGE
George Basbas *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 167-174 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

N83-27715# New York Univ., New York. Dept. of Physics.
EFFECTIVE CHARGE OF ENERGETIC IONS IN METALS
M. Kitagawa (North Shore College) and Werner Brandt *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 175-187 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

N83-27717# Waseda Univ., Tokyo (Japan). Dept. of Physics.
CALCULATION OF THE EQUILIBRIUM MEAN CHARGE OF HELIUM IONS
T. Kaneko and Y. H. Ohtsuki *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 197-208 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

N83-27718# Kyoto Univ. (Japan). Dept. of Nuclear Engineering.
MEDIUM DEPENDENCE OF CHARGE STATE FRACTIONS OF MeV He BEAM
Fumio Fukuzawa *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 209-213 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

N83-27725# Fermi National Accelerator Lab., Batavia, Ill.
THE LIVERMORE MTA PROJECT AND ITS INFLUENCE ON MODERN LINACS
Philip V. Livdahl *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 5-11 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27726# Atomic Energy of Canada Ltd., Chalk River (Ontario). Accelerator Physics Branch.
LOW ENERGY 100 PERCENT DUTY FACTOR ALVAREZ LINACS AT CHALK RIVER
J. Ungrin, J. C. Brown, B. G. Chidley, R. M. Hutcheon, G. E. McMichael, and S. O. Schriber *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 12-14 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27727# Gesellschaft fuer Schwerionenforschung m.b.H., Darmstadt (West Germany).
STATUS REPORT ON OPERATION AND UPGRADING OF THE UNILAC
N. Angert and D. Boehne *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 15-17 refs (For primary document

see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27728# Nuclear Research Center, Karlsruhe (West Germany). Inst. for Nuclear Physics.
THE LINEAR ACCELERATOR FOR THE PROPOSED GERMAN SPALLATION SOURCE
A. Citron *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 18-21 ref (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27729# Mainz Univ. (West Germany). Inst. fuer Kernphysik.
OPERATING EXPERIENCE WITH MAMI 1
H. Aufhaus, H. Euteneuer, H. Herminghaus, W. Heyne, K. H. Kaiser, H. J. Kreidel, U. Ludwig-Mertin, K. Merle, H. vonderSchmitt, and H. Schoeler *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 22-24 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27730# Argonne National Lab., Ill.
STATUS OF THE ARGONNE SUPERCONDUCTING-LINAC HEAVY-ION BOOSTER
J. Aron, R. Benaroya, L. M. Bollinger, B. E. Clifft, K. W. Johnson, P. Markovich, J. M. Nixon, R. Pardo, K. W. Shepard, and G. Zinkann *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 25-28 refs (For primary document see N83-27724 16-70)
(Contract W-31-109-eng-38)
Avail: NTIS HC A17/MF A01

N83-27731# Los Alamos Scientific Lab., N. Mex.
OCTUPOLE FOCUSING IN TRANSPORT AND ACCELERATION SYSTEMS
K. R. Crandall, M. Pabst, R. H. Stokes, and T. P. Wangler *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 31-35 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27732# Los Alamos Scientific Lab., N. Mex.
MATCHING THE RF QUADRUPOLE BEAM TO THE DRIFT TUBE SECTION IN THE FMIT ACCELERATOR
G. P. Boicourt, R. A. Jameson, and R. S. Mills *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 36-38 ref (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27733# Kernforschungszentrum, Karlsruhe (West Germany).
DEAD BEAT FILLING AND FEEDFORWARD RF CONTROL FOR THE SPALLATION NEUTRON SOURCE SNQ
D. Schulze *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 39-42 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27734# Kernforschungszentrum, Karlsruhe (West Germany).
PREACCELERATOR DESIGN AND COMPONENT DEVELOPMENT FOR THE SNQ LINEAR ACCELERATOR
B. Piosczyk *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 43-45 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27736# Atomic Energy of Canada Ltd., Chalk River (Ontario). Accelerator Physics Branch.
DESIGN AND CONSTRAINTS FOR THE ZEBRA INJECTOR, RFQ AND DTL
B. G. Chidley, J. C. Brown, G. E. McMichael, S. O. Schriber, M. R. Shubaly, and J. Ungrin *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 49-52 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27737# Fermi National Accelerator Lab., Batavia, Ill.
LOSS MONITORS FOR THE FERMILAB LINAC
L. J. Allen, C. D. Curtis, and B. M. Hanna *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 53-55 ref (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27738# Atomic Energy of Canada Ltd., Chalk River (Ontario). Accelerator Physics Branch.
A MICROPROCESSOR-CONTROLLED BEAD PULLER FOR RF CAVITY MEASUREMENTS
J. D. Hepburn and W. L. Michel *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 56-61 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27741# Los Alamos Scientific Lab., N. Mex.
TUNING EXPERIENCE WITH THE FMIT SCALE-MODEL DRIFT-TUBE LINAC
Larry M. Earley, James M. Potter, and Arlo J. Thomas *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 74-76 ref (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27744# Johann-Wolfgang-Goethe-Universitat, Frankfurt am Main (West Germany). Inst. fuer Angewandte Physik.
A FRQ CONCEPT USING CIRCULAR RODS
P. Junior, H. Deitinghoff, K. D. Halfmann, H. Klein, and A. Schempp *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 81-83 refs Sponsored by the Bundesministerium fuer Forschung und Technologie (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27746# Brookhaven National Lab., Upton, N. Y. Accelerator Dept.
FIRST RESULTS ON BNL H- MEQALAC
G. Gammel, J. Brodowski, K. Dobbs, J. Keane, A. Maschke, E. Meier, and R. Sanders *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 89-91 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27747# Institute for Theoretical and Experimental Physics, Moscow (USSR).
THE PULSED PROTON PROTOTYPE OF A HIGH CURRENT ION LINAC
R. M. Vengrov, E. N. Daniltsev, I. M. Kapchinskij, A. M. Kozodaev, V. V. Kushin, N. V. Lazarev, A. A. Nikitin, and I. V. Chuvilo *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 92-95 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27748# Johann-Wolfgang-Goethe-Universitat, Frankfurt am Main (West Germany). Inst. fuer Angewandte Physik.
PROPERTIES OF A 0-MODE RFQ STRUCTURE AND RECENT EXPERIMENTAL RESULTS
H. Klein, A. Schempp, H. Deitinghoff, P. Junior, J. Mueller, R. W. Mueller, K. Langbein, M. Daehne, W. Neumann, and A. Schoenlein *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 96-98 refs Sponsored by Bundeministerium fuer Forschung und Technologie (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27750# California Univ., Berkeley. Lawrence Berkeley Lab.
BEAM DYNAMICS IN HEAVY ION INDUCTION LINACS
Lloyd Smith *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 111-115 refs (For primary document see N83-27724 16-70)
(Contract W-7405-eng-48)
Avail: NTIS HC A17/MF A01

N83-27752# Kernforschungszentrum, Karlsruhe (West Germany).
ON SPACE CHARGE INSTABILITIES AND EMITTANCE GROWTH IN RF LINACS

K. L. Mittag and H. G. Hereward *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 120-124 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27753# Stanford Linear Accelerator Center, Calif.
BEAM PARAMETER MEASUREMENTS FOR THE SLAC LINEAR COLLIDER
J. E. Clendenin, C. Blocker, M. Breidenbach, T. N. Constant, R. J. Hollebecek, M. B. James, M. J. Lee, G. A. Loew, R. J. Miller, J. L. Siegrist et al *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 130-136 refs (For primary document see N83-27724 16-70)
(Contract DE-AC03-76SF-00515)
Avail: NTIS HC A17/MF A01

N83-27755# Institute for Theoretical and Experimental Physics, Moscow (USSR).
THE 1981 LINEAR ACCELERATOR CONFERENCE ON PROTON BEAM EMITTANCE GROWTH IN LINAC
R. P. Kujbida, A. V. Kryzhanovskij, and N. V. Lazarev *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 142-146 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27756# Atomic Energy of Canada Ltd., Chalk River (Ontario). Accelerator Physics Branch.
BEAM DYNAMICS STUDIES OF HIGH CURRENT RFQ AND DTL TANKS
G. E. McMichael and B. G. Chidley *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 149-152 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27757# Kernforschungszentrum, Karlsruhe (West Germany).
STATISTICAL TREATMENT OF MISALIGNMENTS IN LINEAR ACCELERATORS
M. Pabst and K. Bongardt *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 153-155 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27758# Kernforschungszentrum, Karlsruhe (West Germany).
MOTION: A VERSATILE MULTIPARTICLE SIMULATION CODE
K. L. Mittag and D. Sanitz *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 156-158 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27759# Kernforschungszentrum, Karlsruhe (West Germany).
FUNNELING OF HEAVY ION BEAMS
K. Bongardt *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 167-170 refs Prepared in cooperation with Karlsruhe Univ., West Germany (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27760# Los Alamos Scientific Lab., N. Mex.
EVOLUTION OF THE RACETRACK MICROTRON CONTROL SYSTEM
E. R. Martin, C. M. Schneider, V. A. Martinez, R. E. K. Trout, and R. E. Gritzo *In its* Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 171-173 (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27764# Los Alamos Scientific Lab., N. Mex.
VARIABLE-ENERGY DRIFT-TUBE LINACS
D. A. Swenson, T. J. Boyd, Jr., J. M. Potter, and J. E. Stovall *In its* Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 187-190 ref (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27765# Varian Associates, Palo Alto, Calif.
VARIABLE ENERGY STANDING WAVE LINEAR ACCELERATOR STRUCTURE
Eiji Tanabe and Gard Meddaugh *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 191-193 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27767# Argonne National Lab., Ill.
LOW FREQUENCY RFQ LINACS FOR HEAVY ION FUSION
A. Moretti, J. M. Watson, R. L. Martin, R. J. Lari, and R. L. Stockley *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 197-199 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27769# California Univ., Berkeley. Lawrence Berkeley Lab.
REVIEW OF INDUCTION LINACS
A. Faltens and D. Keefe *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 205-213 refs (For primary document see N83-27724 16-70)
(Contract W-7405-eng-48)
Avail: NTIS HC A17/MF A01

N83-27770# Maryland Univ., College Park.
DESIGN OF REC PERMANENT MAGNET QUADRUPOLES TAKING INTO ACCOUNT B, H NON-LINEARITY
Robert L. Gluckstern and Ronald F. Holsinger (Field Effects, Inc., Carlisle, Mass.) *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 214-218 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27771# Fermi National Accelerator Lab., Batavia, Ill.
RECENT WORK ON COLLECTIVE ACCELERATORS
F. T. Cole *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 225-231 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27772# Maryland Univ., College Park.
EXPERIMENTAL STUDIES OF ELECTRON BEAM FOCUSING WITH SOLENOID LENSES NEAR THE SPACE CHARGE LIMIT
M. Reiser, W. Namkung, P. Loschialpo, J. Suter, and J. D. Lawson (Science Research Council, Chilton, England) *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 235-238 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27773# Mainz Univ. (West Germany). Inst. fuer Kernphysik.
BEAM INSTABILITIES IN RACE TRACK MICROTRONS
H. Euteneuer, H. Herminghaus, and R. Klein *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 239-241 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27774# Argonne National Lab., Ill. Accelerator Research Facilities Div.
FOCUSSING CONSIDERATIONS IN THE RACE TRACK MICROTRON AND DOUBLE-SIDED MICROTRON
Eugene P. Colton *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 242-244 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27775# Mainz Univ. (West Germany). Inst. fuer Kernphysik.
AUTOMATIC BEAM-STEERING OF THE MAINZ MICROTRON
H.-J. Kreidel and K. Merle *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 245-247 (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27776# Atomic Energy of Canada Ltd., Chalk River (Ontario). Accelerator Physics Branch.
ION SOURCE DEVELOPMENT AND INJECTOR DESIGN FOR

ZEBRA
M. R. Shubaly *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 251-253 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27777# Mission Research Corp., Albuquerque, N. Mex.
THE IMAGE DISPLACEMENT INSTABILITY IN RADIAL LINE ACCELERATORS
B. B. Godfrey, H. J. Adler, M. M. Campbell, D. J. Sullivan, and T. C. Genoni (AFWL) *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 257-259 refs Sponsored by AFWL (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27778# Mainz Univ. (West Germany). Inst. fuer Kernphysik.
THE DESIGN OF DOUBLE SIDED MICROTRONS
H. Heringhaus, K.-H. Kaiser, and U. Ludwig-Mertin *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 260-262 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27779# Stanford Linear Accelerator Center, Calif.
DESIGN OF AN ELECTRON BEAM SPECTRAL MODIFICATION SYSTEM
J. C. Sheppard, R. C. York, B. E. Norum, and J. S. McCarthy *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 266-269 refs Prepared in cooperation with Virginia Univ., Charlottesville (For primary document see N83-27724 16-70)
(Contracts DE-AC03-76SF-00515; DE-AS05-80ER-10633)
Avail: NTIS HC A17/MF A01

N83-27780# Argonne National Lab., Ill.
LONGITUDINAL BEAM OPTIMIZATION OF THE ARGONNE SUPERCONDUCTING HEAVY-ION LINER ACCELERATOR
R. Pardo, L. M. Bollinger, and W. Henning *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 270-273 refs (For primary document see N83-27724 16-70)
(Contract W-31-109-eng-38)
Avail: NTIS HC A17/MF A01

N83-27781# Mainz Univ. (West Germany). Inst. fuer Kernphysik.
A MODULAR SYSTEM FOR THE CONTROL OF COMPLEX ACCELERATOS USING PORTABLE SOFTWARE
H. vonderSchmitt and H. Aufhaus *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 274-276 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27786# Tokyo Univ. (Japan). Inst. for Nuclear Study.
MEASUREMENT OF MODEL INTER-DIGITAL H TYPE LINAC
T. Fukushima, T. Hattori, T. Hori, K. Sato, E. Tojyo, and K. Yoshida *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 296-298 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27787# Tokyo Univ. (Japan). Inst. for Nuclear Study.
AN RFQ LINAC FOR HEAVY ION ACCELERATION
N. Ueda, S. Arai, T. Nakanishi, T. Hori, N. Tokuda, S. Yamada, T. Fukushima, M. Takanaka, A. Noda, and T. Katayama *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 299-301 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27788# Argonne National Lab., Ill.
A 750 KEV RFQ LINAC FOR THE AGS POLARIZED PROTON PROGRAM
J. M. Watson, D. R. Moffett, A. Moretti, R. L. Stockley, and T. P. Wangler (LASL) *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 306-308 refs (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

N83-27790# Tokyo Univ. (Japan). Inst. for Nuclear Study.
BUNCHER SECTION OPTIMIZATION OF HEAVY ION RFQ LINACS
S. Yamada *In* LASL Proc. of the 1981 Linear Accelerator Conf. Feb. 1982 p 316-318 refs Prepared in cooperation with Lawrence Berkeley Lab., Calif. (For primary document see N83-27724 16-70)
Avail: NTIS HC A17/MF A01

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation.*

N83-27836*# Los Alamos Scientific Lab., N. Mex.
NUCLEAR REACTOR SYSTEM STUDY FOR NASA/JPL Final Report
R. G. Palmer, L. B. Lundberg, E. S. Keddy, and D. R. Koenig Sep. 1982 27 p ref Sponsored by NASA
(NASA-CR-172631; NAS 1.26:172631) Avail: NTIS HC A03/MF A01 CSCL 18K

Reactor shielding, safety studies, and heat pipe development work are described. Monte Carlo calculations of gamma and neutron shield configurations show that substantial weight penalties are incurred if exposure at 25 m to neutrons and gammas must be limited to 10 to the 12th power nvt and 10 to the 6th power rad, instead of the 10 to the 13th power nvt and 10 to the 7th power rad values used earlier. For a 1.6 MW sub t reactor, the required shield weight increases from 400 to 815 kg. Water immersion critically calculations were extended to study the effect of water in fuel void spaces as well as in the core heat pipes. These show that the insertion into the core of eight blades of B4C with a mass totaling 2.5 kg will guarantee subcriticality. The design, fabrication procedure, and testing of a 4m long molybdenum/lithium heat pipe are described. It appears that an excess of oxygen in the wick prevented the attainment of expected performance capability. S.L.

N83-27837# Los Alamos Scientific Lab., N. Mex.
SPACE REACTORS Progress Report, Jul. - Sep. 1981
William A. Ranken Jun. 1982 40 p
(Contract W-7405-eng-36)
(DE82-019187; LA-9479-PR) Avail: NTIS HC A03/MF A01

Progress in technology development for the Space Power Advanced Reactor (SPAR) project is reported. The weights of neutron and gamma shields required to protect the SPAR system payloads for a range of permissible exposures was determined, and initial results are reported. SPAR reactor safety in the case of water immersion was modeled. Approval in principle was received for the SPAR fuel test in the Experimental Breeder Reactor; the heat pipe developed for this test is performing well. SPAR system design variations are being examined under the possibility of using long core heat pipes. Testing of the initial molybdenum/sodium artery heat pipe continued, with ambiguous results. Fabrication of the first all bonded thermoelectric units was completed and testing was initiated. DOE

N83-27838# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
FIGURE-OF-MERIT ANALYSIS AND COST EFFECTIVENESS OF LOW-LEVEL RADIOACTIVE WASTE TREATMENT SYSTEMS
N. D. Cox, K. L. Falconer, M. D. McCormack, H. D. Hootman (Du Pont de Nemours (E. I.) and Co., Aiken, S. C.), and T. K. Thompson (T. K. T., Inc., White Rock, N. Mex.) 1982 19 p refs Presented at the ANS Topical Meeting on Treatment and Handling of Radioactive Wastes, Richland, Wash. 19 Apr. 1982
(Contract DE-AC07-76ID-01570)
(DE82-018890; EGG-M-11282; CONF-820424-30) Avail: NTIS HC A02/MF A01

Two studies were performed to assess low level waste treatment systems that are available commercially for volume reduction and/or solidification. In the first, a Figure-of-Merit (FOM) decision analysis technique was used to evaluate fourteen low level radioactive waste processing systems on their ability to treat power reactor wastes. The assessment of the various processing systems was accomplished using a five member task force. The systems were judged on eleven major criteria and twenty subcriteria. The system judged superior to all the others was compaction of dry wastes with liquid wastes and sludges being directly incorporated into concrete. This was also the lowest cost system. The controlled air incinerator was judged the preferred incineration process. The Werner-Pfleider bitumen extruder was the preferred liquid waste treatment system. In the second study, the cost economy of volume reduction measured in land disposal dollars was investigated. DOE

N83-27839# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
INCINERATOR DEVELOPMENT PROGRAM FOR PROCESSING TRANSURANIC WASTE AT THE IDAHO NATIONAL ENGINEERING LABORATORY
T. G. Hedahl 1982 10 p Presented at the ANS Topical Meeting on Treatment and Handling of Radioactive Wastes, Richland, Wash., 19 Apr. 1982
(Contract DE-AC07-76ID-01570)
(DE82-017265; CONF-820424-29) Avail: NTIS HC A02/MF A01

In the fall of 1981, two short term tests were conducted on a controlled air and a rotary kiln incinerator to assess their potential for processing transuranic (TRU) contaminated waste at the Idaho National Engineering Laboratory (INEL). The primary purpose of the test program was a proof of principle verification that the incinerators could achieve near complete combustion of the combustible portion of the waste, while mixed with high percentages of noncombustible and metal waste materials. Other important test objectives were to obtain system design information including off-gas and end-product characteristics and incinerator operating parameters. Approximately 7200 kg of simulated (non-TRU) waste form the INEL were processed during the two tests. DOE

N83-27840# Tufts Univ , Medford, Mass.
HIGH-ENERGY PHYSICS AT TUFTS UNIVERSITY Final Report
31 Dec. 1982 27 p
(Contract DE-AC02-76ER-03023)
(DE83-007503; DOE/ER-03023/31) Avail: NTIS HC A03/MF A01

Principal accomplishments include: measurement of the near equality of the charmed D0 and D(+) lifetimes; determination of important features of nu/sub (SIGMA)/ cross sections on nucleons, of majority quark momentum distributions, of charmed (DELTA)/sub c/ () production and decay of quark and di-quark fragmentation, and of Z0 left-handed couplings to u- and d-quarks; the second observation of the upsilon particle; the hadronic production of the J/psi particle via the chi charmonium state; observation of virtual-proton shadowing in deep-inelastic muon scattering; and observation of evidence for two new scalar meson states. In theoretical work, a detailed understanding of the nature of optimal representations of amplitudes and observables in scattering processes was achieved. DOE

N83-27841# Los Alamos Scientific Lab., N. Mex.
LAMPF: PROPOSAL STATUS AND SUMMARIES
Lois Rayburn, comp. and Beverly Talley, comp. Mar. 1982 132 p
(Contract W-7405-eng-26)
(DE82-015887; LA-7444-SR-Rev-3) Avail: NTIS HC A07/MF A01

Revisions and additions are given for proposal summaries and status reports. Experiments include nuclear chemistry, biomedical research, external proton beam, isotope production and radiation damage, low energy pions, etc. DOE

N83-27842# California Univ., Livermore. Lawrence Livermore Lab.
MODELING BEAM-FRONT DYNAMICS AT LOW GAS PRESSURES
R. J. Briggs and S. Yu 13 May 1982 47 p refs
(Contract W-7405-eng-48; ARPA Order 4395)
(DE82-016636; UCID-19399) Avail: NTIS HC A03/MF A01

The dynamics of space charge neutralization at the front of an intense self-focused electron beam pulse exhibits important differences in different gas pressure regimes. At very low pressures, the beam front is in the so-called ion focused regime where all secondary electrons are expelled from the beam region by the radial electric field without causing significant additional ionization. The upper pressure boundary of this regime is estimated by considering the distance scale length for cascade (avalanche) ionization. Data from the FX-25 diode experiments indicate a critical transition pressure (P/sub c) that agrees with this estimate and with its scaling among various gas types. Normal mobility-limited treatments (local conductivity models) of the secondary electrons at the beam front are not justified until the gas pressure is 10 to 50 times higher than P/sub c/, due to runaway of these secondary electrons in the strong space charge electric field at the lower pressures. DOE

N83-27843# California Univ., Livermore. Lawrence Livermore Lab.
COMPARISON OF THE INITIAL ETA GAS-PROPAGATION EXPERIMENTS WITH THEORETICAL MODELS
Frank W. Chambers, John C. Clark, and Thomas J. Fessenden 20 Apr. 1982 33 p refs
(Contracts W-7405-ENG-48; N60921-80-WR-W0188; ARPA Order 3718)
(DE82-015415; UCID-19383) Avail: NTIS HC A03/MF A01

The initial ETA propagation experiments in air at a beam current of 4.5 kA is described. The beam was observed to propagate at the pressures anticipated on the basis of previous theory and experiment. A comparison of measured net current waveforms with predictions of the PHOENIX code showed good agreement over the pressure range 0.1 to 200 torr. However, the beam was observed to expand with Z at a faster rate than theory predicts. Excessive transverse beam modulation at injection complicated the experiments and limited their comparison with theory. DOE

N83-27844# Ford, Bacon and Davis Utah, Inc., Salt Lake City.
LOW-LEVEL RADIOACTIVE WASTE DISPOSAL. STUDY OF A CONCEPTUAL NUCLEAR ENERGY CENTER AT GREEN RIVER, UTAH
Darrell H. Card, Preston H. Hunter, Don Barg, Ferdinand deSouza, Karen Felthauser, Vern Winkler, and Rich White Feb. 1982 94 p refs
(Contract W-7405-eng-26)
(DE83-006835; ORNL/SUB-7846/11) Avail: NTIS HC A05/MF A01

The ramifications of constructing a nuclear energy center in an arid western region were studied. The alternatives for disposing of the low level waste on the site are compared with the alternative of transporting the waste to the nearest commercial waste disposal site for permanent disposal. Both radiological and nonradiological impacts on the local socioeconomic infrastructure and the environment are considered. Disposal on the site was found to cost considerably less than off site disposal with only negligible impacts associated with the disposal option on either mankind or the environment. DOE

74 OPTICS

Includes light phenomena.

N83-27845*# Spectron Development Labs., Inc., Costa Mesa, Calif.

FEASIBILITY STUDY OF THREE-DIMENSIONAL HOLOGRAPHIC INTERFEROMETRY FOR AERODYNAMICS Final Report
J. E. Craig May 1983 64 p refs
(Contract NAS2-19573)
(NASA-CR-166483; NAS 1.26:166483) Avail: NTIS HC A04/MF A01 CSCL 20F

Laser holographic interferometry was tried as a nonintrusive diagnostic tool for studying unsteady two dimensional flows. A NACA 0012 airfoil was tested, while undergoing dynamic stall, over a range of Mach numbers of 0.3 to 0.5, Reynolds number of 0.5 x 10 to the 6th power to 2 x 10 to the 6th power, and at reduced frequencies of 0.015 to 0.15. It was found that both quantitative and qualitative data could be obtained by the technique. Surface pressures on the airfoil can be measured to within 1% of those measured with orifices and pressure transducers when the flow is attached. Velocity profiles were measured near the wake region, and they compared very well with laser velocimeter data for attached flows. For separated flows with large scale vortices, densities can be measured, but pressures and velocities cannot be deduced with the assumption of constant pressure gradient in the normal direction. The sensitivity of the interferograms was good at a Mach number of 0.4 and a Reynolds number of 4 x 10 to the 6th power/ft; the sensitivity worsened at smaller Mach numbers and Reynolds numbers, and improved at larger ones. Author

N83-27846*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
DEVELOPMENT OF A SIMPLIFIED OPTICAL TECHNIQUE FOR THE SIMULTANEOUS MEASUREMENT OF PARTICLE SIZE DISTRIBUTION AND VELOCITY
James Lee Smith Jun. 1983 33 p refs
(NASA-TP-2185; M-413; NAS 1.60:2185) Avail: NTIS HC A03/MF A01 CSCL 20F

Existing techniques were surveyed, an experimental procedure was developed, a laboratory test model was fabricated, limited data were recovered for proof of principle, and the relationship between particle size distribution and amplitude measurements was illustrated in an effort to develop a low cost, simplified optical technique for measuring particle size distributions and velocities in fluidized bed combustors and gasifiers. A He-Ne laser illuminated Rochi Rulings (range 10 to 500 lines per inch). Various samples of known particle size distributions were passed through the fringe pattern produced by the rulings. A photomultiplier tube converted light from the fringe volume to an electrical signal which was recorded using an oscilloscope and camera. The signal amplitudes were correlated against the known particle size distributions. The correlation holds true for various samples. Author

N83-27847# Fraunhofer-Inst. fuer Atmosphaerische Umweltforschung, Garmisch-Partenkirchen (West Germany).
ATMOSPHERIC CONDITIONS INFLUENCING SLANT PATH LOW VISIBILITY Interim Report, Sep. 1981 - Jan. 1982
Reinhold Reiter, Walter Carnuth, Rudolf Sladkovic, and Werner Funk Jan. 1982 64 p ref
(Contract DAJA37-80-C-0345; DA Proj. 1T1-61102-BH-5701)
(AD-A116109; IR-4) Avail: NTIS HC A04/MF A01 CSCL 20/6

Results of transmission measurements in the visible and thermal infrared range along a slant path of 2.7 km length and 19 deg inclination are presented. To infer correlations, all meteorological parameters, visibility, aerosol spectrum are measured at both ends of the path. For monitoring the aerosol distribution along the path serves a four frequency lidar (ranging between 380 and 1060 nm). Transmissivity and extinction coefficient in VIS and IR are parameterized considering the following quantities: clouds, mist, haze, aerosols, rate of rainfall, and snowfall. GRA

N83-27848# Maryland Univ., College Park. Computer Vision Lab.
CONTOUR-BASED MOTION ESTIMATION
Larry S. Davis, Zhongguan Wu, and Hanfang Sun Jun. 1982 31 p refs
(Contract DAAG53-76-C-0138; DARPA Order 3206)
(AD-A124812; TR-1179) Avail: NTIS HC A03/MF A01 CSCL 20/6

This paper introduces a contour-based approach to motion estimation. It is based on first computing motion at image corners, and then propagating the corner motion estimates along the principal contours in the image based on a local 2 1/2D motion assumption. The results of several experiments are presented. The earliest problem that arises in the analysis of time varying images is the detection of moving image elements (edge, regions) and the computation of the image velocity (optic flow) of those elements. A variety of computational schemes have been proposed to solve this problem. GRA

N83-27849# Maryland Univ., College Park. Computer Vision Lab.
DETERMINING VELOCITIES BY PROPAGATION
Zhongguan Wu, Hanfang Sun, and Larry S. Davis Dec. 1981 21 p refs
(Contract DAAG53-76-C-0138; DARPA Order 3206)
(AD-A124889; TR-1132) Avail: NTIS HC A02/MF A01 CSCL 20/6

A velocity propagation technique is described that determines velocity vectors at the points of a contour, based on the velocities at the endpoints of the contour and the normal components of velocity along the contour. This technique can, at least, for simple motions, reliably determine motion vectors along image contours. Although the propagation procedure was implemented as a sequential procedure which traces out contours, it is important to note that the process is not inherently sequential and can be formulated as a parallel process operating on a network of image contours. The few examples contained in this paper all contained a single moving object. In more complex scenes, one must consider the problem of avoiding the propagation of motion vectors from one moving object to another. Also, the ability of the technique to deal with more general motions was not considered in this paper. All of these issues will be dealt with in subsequent reports. GRA

N83-27850# Los Alamos Scientific Lab., N. Mex.
OVERVIEW OF PULSERS FOR NANOSECOND GATING OF IMAGE-SHUTTER TUBES
G. J. Yates, J. W. Ogle, N. S. P. King, and I. Aeby 1982 5 p Presented at the 26th Tech. Symp. and Exhibition of the International Society for Optical Engineering, San Diego, Calif., 21 Aug. 1982
(Contract W-7405-eng-36)
(DE82-019533; LA-UR-82-2159; CONF-820822-3) Avail: NTIS HC A02/MF A01

The capability of generating a useful optical shutter of a few nanoseconds or less utilizing gated proximity-focussed microchannel-plate (MCP) wafer tubes or silicon intensified target (SIT) vidicon tubes depends strongly on the driving electrical pulse. Some electrical gate pulsers utilized in studying both proximity-focussed MCP imaging intensifiers and gated SIT FPS vidicon tubes are summarized. DOE

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

For ionospheric plasmas see *46 Geophysics.* For space plasmas see *90 Astrophysics.*

N83-27851# British Library Lending Div., Boston Spa (England).
USE OF THE REGULARIZATION METHOD FOR DESIGNING THE EQUILIBRIUM SYSTEM OF A TOKAMAK REACTOR HAVING A SPECIFIED PLASMA GEOMETRY
O. G. Filatov 10 Feb. 1983 23 p refs Transl. into ENGLISH of prepring no. B-0551 D. V. Efremov Scientific Research Inst. of Electrophysical Apparatus, Leningrad, 1981
(BLL-CTO-2117-(9091.9F)) Avail: British Library Lending Div., Boston Spa, Engl.

The design of the equilibrium system for a Tokamak reactor

is analyzed using a method which enables the direct determination of the currents in the coils of the system which are required to maintain in equilibrium in a plasma having given parameters and a given geometry. The regularization parameter is chosen so as to make the accuracy of the solution comparable with that of the initial data defined by the plasma parameters. The stability of the solution obtained is assured, both in the normal mathematical sense and in terms of being insensitive to uncertainties in the initial physical data. A.R.H.

N83-27852# British Library Lending Div., Boston Spa (England).
LINEAR PROBLEM OF INDUCTOR SYNTHESIS FOR A TOKAMAK THERMONUCLEAR APPARATUS
O. G. Filatov 10 Feb. 1983 14 p refs Transl. into ENGLISH of preprint B-0562 D. V. Efremov Scientific-Research Inst. of Electrophysical Apparatus, Leningrad, 1982
(BLL-CTO-2116-(9091.9F)) Avail: British Library Lending Div., Boston Spa, Engl.

The calculation of currents in the coils of a Tokamak inductor which will create a magnetic flux of a required value, under conditions that the leakage field in the region of the discharge vessel should not exceed a specified level is considered. The problem is solved by the regularization method, on the assumption that the coordinates of the coils are given and the inductor has no iron core. The regularization parameter is chosen according to the condition imposed on the leakage field. Author

N83-27853# Nagoya Univ. (Japan). Inst. of Plasma Physics.
EXPERIMENTAL STUDIES ON ENERGY TRANSPORT IN A REVERSED FIELD THETA PINCH
Y. Aso, S. Himeno (Hokkaido Univ.), and K. Hirano Mar. 1983 40 p refs
(IPPJ-626) Avail: NTIS HC A03/MF A01

Energy transport through various processes was evaluated, as is consistent with the observed volume averaged quantities which are changing in time with a quasi-static manner. It was found that the dominant energy loss mechanism is particles loss, which accounts for more than 50% of the power flow out of the FRC. The second important process is the electron thermal conduction loss which is estimated to be roughly 30% of the total loss if impurity radiation losses other than by carbon and oxygen are not important. In contrast, the ion thermal conduction loss is observed to be so small as to be hidden by the experimental errors. Radiation loss has been estimated to play a minor role if the observed effective ion charge can be ascribed to contaminations of only carbon and oxygen. The inferred energy confinement time is 7 micro sec which compares with the observed particle confinement time of 17 micro sec. The data indicate that observed particle confinement time is consistent with classical diffusion theories. Author

N83-27854# Nagoya Univ. (Japan). Inst. of Plasma Physics.
NUMERICAL SIMULATIONS FOR INTENSE LIGHT-ION BEAM PROPAGATION IN CHANNEL UNDER INFLUENCE OF PLASMA INERTIA
Shigeo Kawata (Tokyo Institute of Technology) and Keishiro Niu (Tokyo Institute of Technology) Mar. 1983 21 p refs
(IPPJ-627) Avail: NTIS HC A02/MF A01

The intense light ion beam (LIB) propagation through a plasma channel is numerically investigated by using a two dimensional simulation code. Analyses are given for the LIB propagation which couples with the motion of channel plasma. Although the electron back current neutralizes the LIB current under a typical beam and channel plasma condition, the Lorentz force by the electron back current expands the LIB radially. The expansion of the LIB depends strongly on the density of the channel plasma. A strong current of the orde of 1 MA is shown to propagate stably in the argon plasma channel. Author

N83-27855# Nagoya Univ. (Japan). Inst. of Plasma Physics.
MEASUREMENT OF THE HELICAL FIELD OF JIPP T-11
T. Sometani and S. Tanahashi Mar. 1983 10 p refs
(IPPJ-625) Avail: NTIS HC A02/MF A01

The measured toroidal helical field of JIPP T-II apparatus does not vanish on the geometrical axis of the helical winding of the apparatus, contrary to the expectation of a known usual theory. The result of measurement can be explained only by an improved theory. Author

N83-27856# Nagoya Univ. (Japan). Inst. of Plasma Physics.
PLASMA BEHAVIORS IN THE OPEN FIELD REGION OF RESED-FIELD THETA-PINCH
Mar. 1983 12 p refs
(IPPJ-624) Avail: NTIS HC A02/MF A01

A characteristic behavior of the plasma in an open field region of reversed field theta pinch was studied with the guide field (GF) which extends the field line along the axial direction. The experimental result suggests that the rotational instability may be induced in FRC after the plasma touches the wall at the ends of the open field. Author

N83-27857# Nagoya Univ. (Japan). Inst. of Plasma Physics.
SIMPLE METHOD OF SHEET PLASMA PRODUCTION IN LOWER PRESSURE
Joshin Uramoto Mar. 1983 13 p refs
(IPPJ-628) Avail: NTIS HC A02/MF A01

A method is described for producing sheet plasma in a lower pressure (approximately 2 x 10 to the -4 power Torr of H2). A primary sheet plasma produced between a discharge anode and cathode by the previous method due to two rectangular magnets, diffuses into the low pressure region through a rectangular slit of the anode while electrons are reflected along magnetic field by a floating metal plate at the end of the plasma. Author

N83-27858# Illinois Univ., Urbana. Fusion Studies Lab.
CURRENT INTERRUPTION AND PARTICLE BEAM GENERATION BY A PLASMA FOCUS Annual Interim Report, 30 Sep. 1981 - 30 Sep. 1982
Glenn Gerdin and Francesco Venneri 30 Nov. 1982 62 p refs (Grant AF-AFOSR-0121-79; AF Proj. 2301)
(AD-A125024; AFOSR-83-0037TR) Avail: NTIS HC A04/MF A01 CSCL 20/7

Through collaboration with Dr. K. H. Schoenbach of Texas Tech University the plasma focus opening switch (PFOS) was revised to answer basic questions as to utility of the concept. To estimate the plasma temperature and classical resistivity a soft X-ray spectrometer and X-ray pinhole camera were developed. The temperature was estimated from a coronal model to range between 0.4 to 0.5 keV for either a nitrogen or neon impurity (1 to 2%) in deuterium at 3 torr. Strong pinches were observed in pure neon (0.6 torr) with an electron temperature in the same range. The corresponding classical resistance of the pinch is 9 m omega whereas 500 m omega is more consistent with output voltage pulse and current flow at interruption indicating anomalous resistivity is present. A one-dimensional two-fluid computer code has been developed to model anomalous resistivity in the pinch phase and preliminary results are consistent with the snowplow model. The final analysis of the plasma focus particle beam generation experiments was completed and a strong correlation was found for the beam-target model as the mechanism for neutron production in the Illinois plasma focus device. Author (GRA)

N83-27859# Los Alamos Scientific Lab., N. Mex.
RECENT RESULTS ON THE DENSE Z-PINCH
J. E. Hammel, J. S. Shlachter, and D. W. Scudder 1982 27 p refs Presented at the Conf. on New Trends in Unconventional Approaches to Magnetic Fusion, Stockholm, 16-18 Jun. 1982
(Contract W-7405-eng-36)
(DE82-015802; LA-UR-82-1494; CONF-820644-4) Avail: NTIS HC A03/MF A01

A detailed description of the ongoing high density Z-pinch experiments at Los Alamos is given. A review of past dense experiments is included. A model for a dense Z pinch as a high-Q, low yield, reactor system is presented. DOE

N83-27860# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
PRELIMINARY CALCULATIONS FOR TESTING A FISSION/FUSION HYBRID BLANKET MODULE IN A FISSION REACTOR: ADDENDUM 2
M. L. Takata and A. J. Scott May 1982 19 p refs
(Contract DE-AC07-76ID-01570)
(DE82-015622; EGG-PHYS-5615-ADD.2) Avail: NTIS HC A02/MF A01

Neutronic calculations are performed for a fission/fusion hybrid blanket module in a fission reactor to compare the performance of the module with a uranium 238 blanket in a fission environment versus a fusion environment. The analysis is based on placing a first wall/blanket module the Tandem Mirror Hybrid Reactor (TMHR) Benchmark Design, in the Engineering Test Reactor (ETR) at the Idaho National Engineering Laboratory. Heating rates, tritium breeding, and reaction rates are computed for the uranium 238 hybrid module located on one side of the ETR core. The calculations are performed with one dimensional S/sub n/ transport theory using ANISN and a coupled 121 group (100n, 21 gamma) library. The results are compared with the rates for the hybrid blanket module in a fusion environment. The total heating and tritium breeding rates of the hybrid blanket are greater in ETR operating at 175 MW than in the TMHR at a 1 MW/ square m wall loading. However, the uranium 238 capture and fission rates are lower in the ETR environment by factors of 1.6 and 7.4, respectively. DOE

N83-27861# Los Alamos Scientific Lab., N. Mex.
HIGH-POWER-DENSITY APPROACHES TO MAGNETIC FUSION ENERGY: PROBLEMS AND PROMISE OF COMPACT REVERSED-FIELD PINCH REACTORS (CRFPR)
Randy L. Hagenson (Technology International, Inc.), Robert A. Krakowski, and Harry Dreicer 1982 25 p refs Presented at the Conf. on New Trends in Unconventional Approaches to Magnetic Fusio ı, Stockholm, 16-18 Jun. 1982
(Contract W-7405-eng-36)
(DE82-015736; LA-UR-82-1480; CONF-820644-2) Avail: NTIS HC A02/MF A01

If the cost assumptions upon which the positive assessment of conventional large superconducting fusion reactors are based proves optimistic, approaches that promise considerably increased system power density and reduced mass utilization are required. These more compact reactor embodiments generally must operate with reduced shield thickness and resistive magnets. Because of the unique magnetic topology associated with the Reversed Field Pinch (RFP), the compact reactor embodiment of this approach is particularly attractive from the view point of low field resistive coils operating with Ohmic losses that are small relative to the fusion power. The RFP, one example of a high power density (HPD) approach to magnetic fusion energy. A comprehensive system model is described and applied to select a unique, cost optimized design point that is used for a subsequent conceptual engineering design of the Compact RFP Reactor. DOE

N83-27862# Los Alamos Scientific Lab., N. Mex. Compact Toroid Staff.
STABILITY AND CONFINEMENT OF SPHEROMAKS AND FIELD-REVERSED CONFIGURATIONS
W. E. Quinn 1982 37 p refs Presented at the Intern. Conf. on Plasma Phys., Goteborg, 9-15 Jun. 1982
(Contract W-7405-eng-36)
(DE82-018378; LA-UR-82-1558; CONF-820618-6) Avail: NTIS HC A03/MF A01

The formation, confinement and stability of two types of compact toroids, spheromaks and field reversed configurations (FRC), are reviewed. Spheromaks which contain both toroidal and poloidal magnetic fields, were formed with magnetized coaxial plasma guns, by a combination of Z and theta pinch techniques and by an electrodeless slow induction technique, and trapped in both prolate and oblate flux conservers. As predicted by theory, the prolate configuration is unstable to the tilt mode, but the oblate configuration with a conducting wall is stable. Configuration lifetimes of up to 0.8 ms are observed. The FRC is a high-beta, highly prolate compact toroid formed with field reversed theta pinch techniques and having purely poloidal magnetic field. Theory predicts unstable fluting and internal tilting modes, but they are not observed experimentally. Configurations with high densities approximately 10 to the 15th power 1/cubic cm and with lifetimes of 50 to 120 microns are terminated by an n=2 rotational mode of instability. DOE

N83-27863# Sandia Labs., Albuquerque, N. Mex.
INERTIAL FUSION RESEARCH BASED ON PULSED POWER
Gerold Yonas 1982 10 p refs Presented at the 9th Intern. Conf. on Plasma Phys. and Controlled Nuclear Fusion Res., Baltimore, 1-8 Sep. 1982
(Contract DE-AC04-76DP-00789)
(DE82-018294; SAND-82-0289C; CONF-820930-3; IAEA-CN-41/N-1) Avail: NTIS HC A02/MF A01

With design parameters of 3.5 MJ and 100 TW PBFA 2 is being designed to allow inertial fusion ignition experiments using imploding foils or light ion beams. Flexibility is being retained to implode a cylindrical foil through magnetically insulated power concentration at 30 MA or to drive one or more ion diodes operating in the 10-MV range. In both cases the goal is to deliver 100 TW/square cm and 1 MJ to a target in order to investigate ignition and possibly break even. Imploding foil data on Proto II demonstrates that electromagnetic energy can be efficiently converted into foil kinetic energy with the output increasing as the square of the foil current. Experiments reached 60 kJ at 5 MA with the foil imploding in 80 ns and stagnating in 10 ns. This implosion demonstrates adequate stability, and modeling shows that this behavior should extrapolate to higher currents if the implosion time is less than 100 ns. DOE

N83-27864# Missouri Univ., Rolla. Dept. of Electrical Engineering.
RESEARCH SUPPORT FOR PLASMA DIAGNOSTIC ON ELMO BUMPY TORUS. OBSERVATIONS OF EBT RING GEOMETRY BY MEANS OF DIAMAGNETIC FIELD MEASUREMENTS USING A COMPENSATED FERROMAGNETIC RESONANCE MAGNETOMETER, AND A PRELIMINARY NUMERICAL STUDY OF EBT FLUX PENETRATION DYNAMICS Final Report, 1 Oct. 1981 - 30 Sep. 1982
Kenneth H. Carpenter and Robert H. Booker Oct. 1982 116 p refs
(Contract W-7405-eng-26)
(DE83-007883; ORNL/SUB-7676/3) Avail: NTIS HC A06/MF A01

A preliminary numerical study of flux penetration dynamics was made assuming a bumpy cylinder geometry for the elmo bumpy torus (EBT) vacuum vessel. Estimates made show that the diamagnetic signal from the rings should penetrate the vacuum vessel in a time on the order of 100 mS when the plasma is changed. This penetration time appears qualitatively reasonable. DOE

N83-27865# Los Alamos Scientific Lab., N. Mex.
COMPACT TOROID EXPERIMENTS: SPHEROMAKS AND FIELD-REVERSED CONFIGURATIONS
W. E. Quinn 1982 10 p refs Presented at the Symp. on New Trends in Unconventional Approaches to Magnetic Fusion, Stockholm, 16-18 Jun. 1982 Submitted for publication
(Contract W-7405-eng-36)
(DE82-015882; LA-UR-82-1397; CONF-820644-3) Avail: NTIS HC A02/MF A01

Compact toroids containing both poloidal and toroidal magnetic field spheromaks, are generated in the CTX experiment using a magnetized coaxial plasma gun, and are trapped and stably confined in an oblate flux conserver. Total configuration lifetimes are observed up to approx. 0.8 ms, consistent with classical resistive decay. The field reversed configuration (FRC) is a high beta, axisymmetric, highly prolate compact toroid, containing only poloidal magnetic field, formed in a field-reversed theta pinch. A quiescent confinement period of 30 to 90 microns with T sub i

approx. 200 to 500 eV and n approx. 5 x 10 to the 15th power cm(-3) is terminated by an n = 2 rotational instability. The FRC is stable to MHD modes including the tilting instability. DOE

N83-27866# Princeton Univ., N. J. Plasma Physics Lab.
IDEAL MHD STABILITY CALCULATIONS IN AXISYMMETRIC TOROIDAL COORDINATE SYSTEMS
R. C. Grimm, R. L. Dewar, and J. Manicham Mar. 1982 43 p refs
(Contract DE-AC02-76CH-03073)
(DE82-009830; PPPL-1885) Avail: NTIS HC A03/MF A01

A scalar form of the ideal MHD energy principle is shown to provide a more accurate and efficient numerical method for determining the stability of an axisymmetric toroidal equilibrium than the usual vector form. Additional improvement is obtained by employing a class of straight magnetic field line flux coordinates which allow for an optimal choice of the poloidal angle in the minor cross section of the torus. The usefulness of these techniques is illustrated by a study (using a code, PEST 2) of the convergence properties of the finite element Galerkin representation in Tokamak and spheromak geometries, and by the accurate determination of critical beta values for ballooning modes. DOE

N83-27867# Scientific Translation Service, Santa Barbara, Calif.
AN INVESTIGATION OF THE DYNAMICS OF THE PLASMA CORONA
Yu. A. Zakharenkov, G. V. Sklizkov, and A. S. Shikanov Jul. 1982 21 p refs Transl. into ENGLISH of Preprint no. 126, Lebedev Physical Inst., Academy of Sciences (USSR), Moscow, 1981 p 1-27
(Contract W-7405-eng-48)
(DE82-019397; UCRL-Trans-11782) Avail: NTIS HC A02/MF A01

Various methods are considered for the experimental investigation of the fundamental parameters of processes transpiring in the interaction of powerful laser radiation with the plasma corona of an irradiated target, determining the effectiveness of acceleration of the nonevaporated layer. A comparison is made with the results of numerous experiments in a broad range of densities of the flux of heating radiation 10 to the 13th power to 10 to the 15th power wt sq cm and the existing theoretical models. The findings cn the hydrodynamics of the plasma corona suggest that, in the considered range of laser fluxes, the thermal conductance is classical and the reduced effectiveness of acceleration of the nonevaporated layer with increase in the flux density is due to the increased thermal losses, associated with heating of the increasing volume of the supercritical plasma. DOE

N83-27868# Oak Ridge National Lab., Tenn. Fusion Energy Div.
EXPERIMENTAL STUDIES ON PUMP LIMITERS
P. Mioduszewski 1982 47 p refs Presented at the 5th Intern. Conf. on Plasma Surface, Gatlinburg, Tenn., 3 May 1982
(Contract W-7405-eng-26)
(DE82-017408; CONF-820545-13) Avail: NTIS HC A03/MF A01

Pump limiters are mechanical devices for He-ash removal, fuel particle control, and possibly impurity control. Different designs have been suggested by various authors over the past decade. However, the magnetic divertor concepts seemed to be more promising, mainly because of their remote plasma-material interactions. All of the characteristics of magnetic divertors have been proven experimentally, but the overall performance and complexity cause concern about their application to Tokamak reactors. Consequently, it is time now to explore the potential of mechanical particle control devices, i.e., pump limiters. Because of the high recycling at the limiter, it is sufficient to exhaust only a small fraction, about 1 to 10%, of the limiter particle flux to remove e.g., He at its rate of production. Pump limiter experiments were conducted on Alcator, PDX, Macrotor, and ISX. Depending on the experimental design, a pressure build-up of between 1 mTorr and 50 mTorr was reported. DOE

N83-27869# Brookhaven National Lab., Upton, N. Y. Accelerator Dept.
TRANSVERSE COHERENT INSTABILITIES AND A DIPOLE FEEDBACK DAMPER FOR COEXISTING COASTING AND BUNCHED BEAMS
J. M. Wang 15 Mar. 1982 20 p refs
(Contract DE-AC02-76CH-00016)
(DE82-016613; BNL-51524) Avail: NTIS HC A02/MF A01

During the stacking cycle at ISABELLE, there are times when the stacked coasting beam and the injected bunched beam coexist inside the same ring rotating in the same directions. The problem of these two beams interacting strongly with each other and oscillating coherently is addressed. An equation is derived for the coherent tune shifts of the collective instability, under the assumption that each beam is monochromatic. The effects of the feedback damper are then considered in the solution. A dispersion relation is set up for when the frequency spreads of the two beams are taken into account. A.R.H.

N83-27870# California Univ., Berkeley. Lawrence Berkeley Lab.
PLASMA LASER ACCELERATOR: LONGITUDINAL DYNAMICS, THE PLASMA/LASER INTERACTION, AND A QUALITATIVE DESIGN
R. D. Ruth and A. W. Chao (Stanford Linear Accelerator Center, Calif.) Apr. 1982 23 p refs Presented at the Workshop on the Laser Acceleration of Particles, Los Alamos, N. Mex., 18 Feb. 1981
(Contracts W-7405-eng-48; DE-AC03-76SF-00098; DE-AC03-76SF-00515)
(DE82-014986; LBL-14332; CONF-810281-1) Avail: NTIS HC A02/MF A01

Studies on a plasma laser accelerator are summarized. First, the longitudinal dynamics and the trapping of particles in the potential well due to the longitudinal electric field in a plasma density wave are considered. Next, the plasma/laser interaction is studied to obtain power requirements. Lastly, a plasma/laser accelerator with parameters somewhat more modest than existing suggestions is quantitatively designed. DOE

N83-27871# Department of Energy, Washington, D. C. Office of Energy Research.
EXPERIMENTAL PLASMA RESEARCH PROJECT SUMMARIES
Oct. 1982 83 p refs
(DE83-007066; DOE/ER-0076/1) Avail: NTIS HC A05/MF A01

The experimental plasma research branch has responsibility for developing a broad range of experimental data and new experimental techniques that are required for operating and interpreting present large scale confinement experiments, and for designing future deuterium-tritium burining facilities. Research results in the areas of plasma properties and heating, plasma diagnostics, atomic physics, Tokamak research, and superconducting materials are summarized. DOE

N83-27872# Wisconsin Univ., Madison. Dept. of Physics.
SHEAR ALFVEN WAVES IN TOKAMAKS Ph.D. Thesis
Cynthia Eliezabeth Kieras Dec. 1982 134 p refs
(Contract DE-AC02-76ET-53051; Grant NSF ECS-81-10038)
(DE83-007194; DOE/ET-53051/48) Avail: NTIS HC A07/MF A01

Shear Alfven waves in an axisymmetric tokamak are examined within the framework of the linearized ideal MHD equations. Properties of the shear Alfven continuous spectrum are studied both analytically and numerically. Implications of these results in regards to low frequency RF heating of toroidally confined plasmas are discussed. The structure of the spatial singularities associated with these waves is determined. A reduced set of ideal MHD equations is derived to describe these waves in a very low beta plasma. DOE

N83-27873# National Science Foundation, Washington, D.C.
END-USE PRODUCTS OF FUSION ENERGY: ALTERNATIVES AND THEIR IMPLICATIONS TO THE FUSION ENERGY R AND D STRATEGY

1982 141 p refs Workshop held at Washington, D.C., 4-5 Mar. 1982
(PB83-151696; NSF/PRA-82028) Avail: NTIS HC A07/MF A01 CSCL 18A

The objectives of the current magnetic fusion program were outlined and the efforts of the Department of Energy to find uses for the products of fusion energy were summarized. Various applications of the high-temperature electrolysis process and the sulfur iodine process in both Tokamak and tandem mirror-type reactors were included. Synthetic fuel production and its role in fusion were addressed. It was suggested that a fusion reactor will never be economically competitive with a fission reactor and that a hybrid may be a viable alternative to a pure fission reactor. Reasons for pursuing the fusion breeder were offered and work on fusion hybrids was reviewed. GRA

N83-27874# National Academy of Sciences - National Research Council, Arlington, Va. Committee on Magnetic Fusion.
FUTURE ENGINEERING NEEDS OF MAGNETIC FUSION Final Report, 15 Feb. - 30 Nov. 1982
30 Nov. 1982 111 p refs
(Contract DE-FG01-82ER-54008)
(PB83-149757) Avail: NTIS HC A06/MF A01 CSCL 18A

A workshop examined engineering needs, how well they can be defined and how the engineering capacity of industry might be engaged more effectively in the magnetic fusion program. The workshop assessed prior conceptual design studies for fusion reactor systems such as tokamaks and magnetic mirror machines, the principal plasma and nuclear subsystem, integration of the subsystems into a whole, future modes of industrial participation, and a sampling of views from the larger engineering community. It was concluded, in particular, that conceptual design studies were valuable. Also, engineering needs for impurity control in he plasma and for reactor materials are in most need of better understanding. Furthermore, actual developments put forward to satisfy most of the perceived engineering needs require proving in the rigorous environment of a reactor-prototypical plasma. The overall conclusion was that the engineering needs of magnetic fusion can be identified with a relatively high level of confidence, within the boundaries of the accumulated scientific evidence and the adopted design objectives, and that development programs have been initiated to address many of these needs. GRA

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

N83-27875*# Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
THERMAL ANALYSIS OF THE VERTICAL BRIDGMAN SEMICONDUCTOR CRYSTAL GROWTH TECHNIQUE Ph.D. Thesis
Thomas John Jasinski Dec. 1982 246 p refs
(Grant NsG-7645)
(NASA-CR-172627; NAS 1.26:172627) Avail: NTIS HC A11/MF A01 CSCL 20L

The quality of semiconductor crystals grown by the vertical Bridgman technique is strongly influenced by the axial and radial variations of temperature within the charge. The relationship between the thermal parameters of the vertical Bridgman system and the thermal behavior of the charge are examined. Thermal models are developed which are capable of producing results expressable in analytical form and which can be used without recourse to extensive computer work for the preliminary thermal design of vertical Bridgman crystal growth systems. These models include the effects of thermal coupling between the furnace and the charge, charge translation rate, charge diameter, thickness and thermal conductivity of the confining crucible, thermal conductivity change and liberation of latent heat at the growth interface, and infinite charge length. The hot and cold zone regions, considered to be at spatially uniform temperatures, are separated by a gradient control region which provides added thermal design flexibility for controlling the temperature variations near the growth interface. S.L.

N83-27876*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
THERMAL CONDUCTANCE OF PRESSED CONTACTS AT LIQUID HELIUM TEMPERATURES
L. J. Salerno, P. Kittel, and A. L. Spivak (Trans-Bay Electronics, Richmond, Calif.) May 1983 8 p refs
(NASA-TM-84365; A-9323; NAS 1.15:84365) Avail: NTIS HC A02/MF A01 CSCL 20K

The thermal contact conductance of a 0.4 micrometer surface finish OFHC copper sample pair has been investigated from 1.6 to 3.8 K for a range of applied contact forces up to 670 N. Experimental data have been fitted to the relation Q = the integral alpha T to the nth power dt by assuming that the thermal contact conductance is a simple power function of the sample temperature. It has been found that the conductance is proportional to T squared and that conductance increases with an increase in applied contact force. These results confirm earlier work. Author

N83-27877*# Rockwell International Corp., Thousand Oaks, Calif. Microelectronics Research and Development Center.
GROWTH AND CHARACTERIZATION OF CZOCHRALSKI-GROWN N AND P-TYPE GaAs FOR SPACE SOLAR CELL SUBSTRATES Final Report, 29 May 1981 - 28 May 1982
R. T. Chen Jun. 1983 51 p refs
(Contract NAS3-22235)
(NASA-CR-168099; NAS 1.26:168099; MRDC41092.35FR) Avail: NTIS HC A04/MF A01 CSCL 20L

Progress in LEC (liquid encapsulated Czochralski) crystal growth techniques for producing high-quality, 3-inch-diameter, n- and p-type GaAs crystals suitable for solar cell applications is described. The LEC crystals with low dislocation densities and background impurities, high electrical mobilities, good dopant uniformity, and long diffusion lengths were reproducibly grown through control of the material synthesis, growth and doping conditions. The capability for producing these large-area, high-quality substrates should positively impact the manufacturability of highly efficiency, low cost, radiation-hard GaAs solar cells. Author

N83-27878# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
DEEP IMPURITIES: A CRYSTALLINE CLUSTER APPROACH
P. S. Guimaraes Apr. 1983 20 p refs Submitted for publication
(INPE-2717-PRE/303) Avail: NTIS HC A02/MF A01

A self-consistent-field approach to the study of deep impurity states in insulators is proposed within the framework of the crystalline-cluster-method. Despite being a cluster method, this procedure is able to take into account the interaction of the impurity electrons with the whole crystal environment in a proper way and it is at least as precise as the crystalline cluster representation of the pure crystal. The model was investigated in the case of an U-center in a NaCl matrix by performing calculations through small 7-atoms clusters. It was observed that even such small clusters are able to provide electronic structures in good agreement with the experimental data. For instance, the U-center 1s yields 2p transition energy is in good agreement with the corresponding experimental absorption peak. Author

N83-27879*# Colorado State Univ., Fort Collins. Dept. of Physics.
EXPERIMENTS WITH PHASE TRANSITIONS AT VERY HIGH PRESSURE Final Report
Ian L. Spain Washington NASA Jun. 1983 30 p refs
(Contract NAGw-8)
(NASA-CR-3696; E-1513; NAS 1.26:3696) Avail: NTIS HC A03/MF A01 CSCL 20L

Diamond cells were constructed for use to 1 Mbar. A refrigerator for cooling diamond cells was adapted for studies between 15 and 300 K. A cryostat for superconductivity studies between 1.5 to

300 K was constructed. Optical equipment was constructed for fluorescence, transmission, and reflectance studies. X-ray equipment was adapted for use with diamond cells. Experimental techniques were developed for X-ray diffraction studies using synchrotron radiation. AC susceptibility techniques were developed for detecting superconducting transitions. The following materials were studied: compressed solidified gases (Xe, Ar), semiconductors (Ge, Si, GaAs), superconductors (Nb3Ge, Nb3Si, Nb3As, CuCl), molecular crystals (I). Author

N83-27880# Michigan Technological Univ., Houghton.
PROPERTIES OF THREE-DIMENSIONAL ENERGETIC SOLIDS AND MOLECULAR CRYSTALS Technical Report, 1 Apr. - 31 Dec. 1982
A. Barry Kunz, T. O. Woodruff, D. R. Beck, R. S. Weidman, and A. K. Ray 1982 7 p refs
(Contract N00014-81-K-0620)
(AD-A124944) Avail: NTIS HC A02/MF A01 CSCL 20/8

This project is designed to investigate a wide range of phenomena related to energetic materials in their solid phase and also on other molecular solids which serve as prototypes. These studies are entirely theoretical in nature and are employing exclusively non-parametric ab-initio techniques. In the case of solid fuels or explosives the area of prime concern is the initiation of combustion or detonation. This may be accomplished by means of shock, or of high temperature or both. Thus we need to be able to study these systems under extreme conditions of temperature or pressure. In order to accomplish this objective it is necessary to extend the normal solid state methods employed for studying the electronic or vibronic structures as such theories are essentially T = O theories. GRA

N83-27881# Rockwell International Corp., Thousand Oaks, Calif. Science Center.
SYNTHETIC STUDIES OF ANTIMONY SULFUR IODIDE AND PREDICTIONS/SYNTHESIS OF NEW NITROGEN CONTAINING CRYSTAL STRUCTURES Final Report, 1 Sep. 1979 - 1 Dec. 1981
P. E. Morgan Feb. 1983 43 p refs
(Contract N00014-79-C-0709)
(AD-A124977; SC5233.1FR) Avail: NTIS HC A03/MF A01 CSCL 07/2

SbSI been grown to needles approximately 1 mm long by hydrothermal techniques. the curious bonding in this compound is discussed. The possible use of Pauling's Second Crystal Rule for predicting anion aliovalent substitution in crystallographic isotopes, particularly of nitrogen, is examined. Bond length/bond strength sums are also reviewed for structures where N-substitution is known. It is predicted that many nitrogen-phosphate mineral type structures can be made. Author (GRA)

N83-27882# Naval Postgraduate School, Monterey, Calif.
SCINTILLATION ANALYSIS OF GAMMA RADIATION WITH CRYSTALS OF BISMUTH GERMANATE M.S. Thesis
Robert R. Cooke Oct. 1982 87 p refs
(AD-A124991) Avail: NTIS HC A05/MF A01 CSCL 20/2

This report provides an introduction to the theory of scintillation counting and analysis of nuclear radiation, with particular attention to an application for bismuth germanate (Bi4Ge3O12), or BGO, scintillator crystals. Radiation damage experiments using 100 MeV electrons from a linear accelerator were conducted to evaluate the induced radiation and subsequent resolution capability of bismuth germanate and thallium activated sodium iodide scintillators. It was shown that BGO has a much higher resistance to radiation damage from electron and photon activation sources. GRA

N83-27883# Argonne National Lab., Ill. Applied Physics Div.
FAST-NEUTRON SCATTERING CROSS SECTIONS OF ELEMENTAL SILVER
A. B. Smith and P. T. Guenther May 1982 25 p refs
(Contract W-31-109-eng-38)
(DE82-019477; ANL/NDM-66) Avail: NTIS HC A02/MF A01

Differential neutron elastic and inelastic scattering cross sections of elemental silver are measured from 1.5 to 4.0 MeV at intervals of less than or equal to 200 kV and at 10 to 20 scattering angles distributed between 20 and 160 degrees. Inelastically scattered neutron groups are observed corresponding to the excitation of levels at; 328 + - 13, 419 + - 50, 748 + -25, 908 + - 26, 1150 + - 28, 1286 + - 25, 1507 + - 20, 1623 + - 30, 1835 + -20 and 1944 + - 26 keV. The experimental results are used to derive an optical statistical model that provides a good description of the observed cross sections. The measured values are compared with corresponding quantities given in ENDF/B-V. DOE

N83-27884# Sandia Labs., Albuquerque, N. Mex.
ELECTRONIC-ENERGY-BAND STRUCTURE OF URANIUM HYDRIDE
A. C. Switendick 1982 13 p refs Presented at Intern. Symp. on the Properties and Appli. of Metal Hydrides, Toba, Japan, 20 May 1982
(Contract DE-AC04-76DP-00789)
(DE82-016393; SAND-81-2017C; CONF-820548-4) Avail: NTIS HC A02/MF A01

The electronic energy bands of alpha and beta UH3 were calculated. These systems are unique among hydride formers in that a transformation directly to a trihydride occurs without an intervening dihydride phase and in that two trihydride structures form, both of which are based on the A-15 (V3Si) structure. Evidence was found of fairly large uranium f electron hydrogen s electron bonding interactionn which is allowed and favored by these structures. The beta-UH3 has eight formula units in the unit cell with the hydrogens tetrahedrally coordinated. As usual there is a lowlying set (24) of hydrogen derived states which overlaps the uranium f levels. This leads to the result of two types of f character: localized (magnetic) and itinerant. This latter type may be as large as one electron/U atom with a greater contribution from the linear chain atoms with a greater contribution from the linear chain atoms which form three of the four hydrogen neighbors than from the bcc like uraniums. DOE

N83-27885# Illinois Univ., Urbana. Dept. of Physics.
ELASTIC CONSTANTS OF PLASTIC CRYSTALS BY SCHAEFER-BERGMANN SCATTERING: CRYSTALLINE CYCLOHEXANE AND DEUTEROMETHANE Ph.D. Thesis
1982 122 p refs
(Contract DE-AC02-76ER-01198)
(DE82-018660; DOE/ER-09982/1385) Avail: NTIS HC A06/MF A01

The Schaefer-Bergmann technique for sound velocity measurement was adapted for use with solidified liquids and gases. The advantages of this method for measuring elastic constants of plastic crystals are discussed. A method for determining both the elastic constants and the spacial orientation of the crystal from the light scattering data is presented. Measurements of sound velocity at 10 MHz in both liquid and solid tetradeuteromethane (CD4) and cyclohexane (C6H12) are described. The elastic constants of CD4 at 85.57 K are found to be C(11) = 2.056 +- .015, C(12) = 1.542 +- .015, C(44) = 0.9387 +- .005 GPa. For cyclohexane at 278.6 K the results of the measurements are C(11) = 2.5795 +- .015, C(12) + 2C(44) = 2.967 +- .03 GPa. It is argued that the separate elastic constants of cyclohexane are C(12) = 2.251, C(44) = 0.358 GPa. The presence of dispersion in the case of cyclohexane and its absence in the case of methane is noted. Some pecularities in the elastic behavior of plastic crystals are discussed in the light of an expected coupling between translational and orientational excitations in the crystal. DOE

N83-27886# Sandia Labs., Albuquerque, N. Mex. Microelectronics Technology Dept.
AUTOMATED C-V AND [Y] OMEGA MESON CURVES FOR MOS DEVICE ANALYSIS
G. F. Derbenwick Apr. 1982 44 p refs Sponsored in part by AF
(Contract DE-AC04-76DP-00789)

(DE82-014268; SAND-80-1308) Avail: NTIS HC A03/MF A01

Two automated systems have been developed to acquire 1 MHz and quasi-static capacitance-voltage curves simultaneously, and parallel Y parallel-omega curves rapidly. Several major innovations have been made over more conventional measurement systems and techniques. The instrumental setups are described, and the equations used to reduce the data are outlined. Examples of typical data acquired on each system are presented. DOE

N83-27887# Sandia Labs., Albuquerque, N. Mex.
MECHANISMS OF ELECTRONIC DESCRIPTION
P. J. Feibelman 1982 11 p refs Presented at Desorption Induced by Electron. Transitions Conf., Williamsburg, Va., 12 May 1982
(Contract DE-AC04-76DP-00789)
(DE82-018590; SAND-82-1381C; CONF-8205110-1) Avail: NTIS HC A02/MF A01

A brief review is given of mechanisms that have been proposed to explain how an initial electronic excitation can lead to desorption of heavy particles (ions, neutral atoms, ...). The further study of such mechanisms should aim at deriving simple rules that will permit the use of desorption as a surface analysis tool, or that will help establish laws of radiation damage. An important experimental goal, currently, is to obtain detailed desorption data for surface systems that are completely characterized geometrically. In the absence of such information, it is difficult to test new theoretical ideas. Concerning covalent adsorption systems, considerable progress has been made, applying simple Hubbard model ideas. A result of this work is the recognition that conditions which promote desorption are 1-fold bonding to the surface, and a closed shell electronic configuration. DOE

N83-27888# Oak Ridge National Lab., Tenn. Solid State Div.
EXPERIMENTAL CHARACTERIZATION OF THE FLUX-LINE LATTICE IN SUPERCONDUCTING V3Si
D. K. Christen, H. R. Kerchner, J. Narayan, Y. K. Chang, B. C. Larson, and S. T. Sekula 1982 5 p refs Presented at Appl. Superconductivity Conf., Knoxville, Tenn., 30 Nov. 1982
(Contract W-7405-eng-26)
(DE83-004647; CONF-821108-12) Avail: NTIS HC A02/MF A01

Microscopic properties of the flux-line lattice (FLL) in three separate single crystals of V3Si were investigated using small-angle neutron diffraction. The samples (V3Si-MP3, -MP4, and -MP5) possessed different defect structures. At low field (B < 0.2 T) and T=4.850K, only MP3, which is free of second-phase precipitates, shows a highly resolved FLL. Sample MP5 contains a low density of small (200 A) coherent precipitates, and reveals well-defined FLL Bragg peaks for B greater than or equal to 0.5 T, but a highly mosaic, nearly polycrystalline FLL at lower fields. Sample MP4 contains large (500 to 1000 A) incoherent precipitates, and shows only a polycrystalline FLL at low field. In both MP3 and MP5, distinct anisotropic correlations were observed between the FLL morphology and the real-crystal direction along the applied field. The FLL perfection was strongly dependent on the growth history. DOE

N83-27889# Illinois Univ., Urbana.
PREPARATION AND CHARACTERIZATION OF GLASSY AND CRYSTALLINE MIXED CHALCOPYRITE SEMICONDUCTING COMPOUNDS
J. M. Cody 1983 65 p refs
(Contract DE-AC02-76ER-01198)
(DE83-005352; DOE/ER-01198/1398) Avail: NTIS HC A04/MF A01

Melting relations, glass formation, and phase stability of selected bulk and thin film chalcopyrite semiconducting alloys were investigated. Bulk ingots of ZnSn sub x Ge sub 1-x As2 and Zn sub x Cd sub 1-x As2 compositions were prepared by quenching vacuum sealed melts and the melting relations were determined by differential thermal analysis (DTA). Additions of ZnSnAs2 to ZnGeAs2 lowered the liquidus temperatures but deep eutectic regions indicative of glass forming compositions were not found in this pseudobinary system. The microstructure and microchemistry of and r-f sputtered ZnGeAs2 thin film and a nitrogen-substituted ZnGe N sub 1-x As sub x) 2 film was also studied. The slightly inhomogeneous as-prepared ZnGeAs2 film was found to undergo distinct phase separation at approx. = 315 C, initial formation of crystallites at approx. = 345 C, followed by complete crystallization at 480 C. STEM microanalysis revealed that the crystallites were Zn-rich and As-deficient in comparison with the overall film composition. N-containing ZnGe (As sub x n sub 1-x 2 films prepared by evaporation techniques were analyzed for amorphism, crystallinity, and microchemistry. DOE

N83-27890# Ames Lab., Iowa.
AN NMR STUDY OF HYDROGEN DIFFUSION IN METAL HYDRIDES CONTAINING PARAMETRIC IMPURITIES Ph.D. Thesis - Iowa State Univ.
Tan-Tee Phua Dec. 1982 183 p refs
(Contract W-7405-eng-82)
(DE83-004859; IS-T-1047) Avail: NTIS HC A09/MF A01

The pulsed NMR of hydrogen nuclei in LaH/sub x/ and YH/sub x/ with and without paramagnetic impurities (Ce, Nd, Gd, Dy, Er) was studied. Measurements of proton T1 were carried out in the temperature range from 77K to 800K at a resonance frequency of 40MHz. The data for both pure laH/sub x/ (1.8 less than or equal to x less than or equal to 2.46) and YH/sub x/ (1.81 less than or equal to x less than or equal to 2.03) show unambiguously that the hydrogen diffusion rate increases with increasing hydrogen content. It is concluded that increased occupancy of the octahedral sublattice causes the potential wells at octahedral and tetrahedral sites to become shallower and lowers the energy barrier to motion between the two sublattices. For systems with controlled dilute paramagnetic impurities, an additional spin-lattice relaxation process was found and appears to be essentially due to the dipolar coupling between impurity and proton moments. The impurity induced relaxation rate is very sensitive to the magnetic moment and relaxation rate of the impurity ion, as well as depending on the host hydride composition. DOE

N83-27891# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
FLUXOID PINNING BY GRAIN BOUNDARIES IN BICRYSTALS AND POLYCRYSTALS OF NIOBIUM
B. C. Cai, A. DasGupta, Y. T. Chou, J. O. Scarbrough, and C. C. Koch 1982 5 p refs Presented at the 9th Intern. Cryogenic Eng. Conf., Kobe (Japan), 10 May 1982 Prepared in cooperation with Lehigh Univ., Bethlehem, Pa.
(Contract W-7405-eng-26; Grant NSF DMR-79-15799)
(DE82-017406; CONF-820546-7) Avail: NTIS HC A02/MF A01

In niobium bicrystals of various preassigned misorientations, the superconducting critical current, I/sub c/ was measured as a function of the applied magnetic field, H, and the azimuthal angle, phi, between the grain boundary and H. Frequently, peaks in I/sub c/(phi) with half width delta phi 1/2 approximately 30 degrees, as well as high pining force, f/sub p/ up to .0001 1/mm at 0.2 T have been found for H both parallel and perpendicular to the grain boundary plane. Using f/sub p/ and delta phi 1/2 obtained from bicrystals, the critical current density, J/sub c/, was calculated for polycrystalline samples. The results are in good agreement with experimental measurements both in magnitude and grain in size dependence. DOE

N83-27709# Chicago Univ., Ill. Dept. of Physics.
ION-CHANNELLING EFFECTS IN SCANNING ION MICROSCOPY WITH A Ga+ PROBE
R. Levi-Setti *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 115-130 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

N83-27710# Hahn-Meitner-Institut fuer Kernforschung, Berlin (West Germany).
ANOMALIES IN THE THICKNESS DEPENDENCE OF THE ENERGY LOSS OF HELIUM AND NITROGEN IONS IN VERY THIN CARBON FOILS

J. P. Biersack and P. Mertens *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 131-135 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

N83-27716# New York Univ., New York. Lab. for Radiation and Solid State.
EFFECTIVE CHARGE OF LOW-VELOCITY NITROGEN, NEON AND ARGON IONS IN CARBON, ALUMINUM AND GOLD
Friedrich Schulz (Gesellschaft fuer Strahlen- und Umweltforschung mbH) and Werner Brandt *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 188-196 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

N83-27719# Kyoto Univ. (Japan). Dept. of Engineering Science.
CHARGE STATE DISTRIBUTION OF LIGHT IONS AT GLANCING COLLISION
M. Mannami, K. Kimura, and N. Kuwata *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 214-221 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

N83-27720# Argonne National Lab., Ill. Physics Div.
INTERACTIONS OF FAST MOLECULAR IONS TRAVERSING THIN FOILS: THE CONTRIBUTION FROM FIELD-IONIZED RYDBERG ATOMS IN MEASUREMENTS ON CONVOY ELECTRONS
Donald S. Gemmell *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 222-255 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

N83-27721# Tokyo Inst. of Tech. (Japan). Research Lab. for Nuclear Reactor.
INTERACTION OF HYDROGEN MOLECULAR IONS WITH THIN FOILS. PART 1: CONVOY ELECTRONS
N. Oda, Y. Yamazaki, and Y. Yamaguchi *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 256-269 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

N83-27722# Tokyo Inst. of Tech. (Japan). Research Lab. of Nuclear Reactors.
INTERACTION OF HYDROGEN MOLECULAR IONS WITH THIN FOILS. PART 2: BALMER EMISSION
H. Kobayashi (Rikkyo Univ.) and N. Oda *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 270-282 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

N83-27723# Tokyo Inst. of Tech. (Japan). Research Lab. for Nuclear Reactors.
INTERACTION OF HYDROGEN MOLECULAR IONS WITH THIN FOILS. PART 3: INNER-SHELL IONIZATION
Y. Yamazaki and N. Oda *In* ORNL Charge States and Dyn. Screening of Swift Ions in Solids Jan. 1983 p 283-292 refs (For primary document see N83-27697 16-70)
Avail: NTIS HC A15/MF A01

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

N83-27892# Canada Inst. for Scientific and Technical Information, Ottawa (Ontario).
MEASUREMENT OF THE THERMODYNAMIC QUANTITIES FOR THE AG-S SYSTEM BY THE EMF METHOD
N. Fukatsu and Z. Kozuka 1983 22 p refs Transl. into ENGLISH from Nippon Knzoku Gakkaishi (Japan), v. 45, no. 12, 1981 p 1263-1270
(NRC/CNR-TT-2062; ISSN-0077-5606) Avail: NTIS HC A02/MF A01

The oxygen potential exhibited by a metal sulfur melt in a state of equilibrium under a given SO2 partial pressure is measured using an oxygen concentration cell that employs a solid oxide electrolyte, and the resulting value provides the information required to indirectly obtain the chemical potential of sulfur in the melt. This approach is not only convenient but also gives highly reproducible results. The results obtained when this method was applied to the Ag-S system are presented. Author

N83-27893# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
HEAT TRANSFER/BOUNDARY LAYER INVESTIGATION OF HEATING DISCREPANCIES IN WIND TUNNEL TESTING OF ORBITER INSULATING ARTICLES M.S. Thesis
Peter T. Cappelano Dec. 1982 108 p refs
(AD-A124803; AFIT/GA/AA/82D-3) Avail: NTIS HC A06/MF A01 CSCL 20/13

Wind tunnel test runs were conducted on Space Shuttle orbiter insulating articles. The data from one HRSI run was processed by a heat estimation program, revealing a large discrepancy in magnitude of the heat transfer coefficient over the HRSI tile when compared to that yielded by flat plate theory and thin skin results. An initial suggestion for the cause of this discrepancy was the nonisothermal wall effect. GRA

N83-27894# Naval Postgraduate School, Monterey, Calif.
APPLICATION OF COMPUTER MODELING TO THE STUDY OF THE THERMODYNAMIC FORCES ACTING ON A BUILDING M.S. Thesis
Peter J. Ibert Jun. 1982 71 p refs
(AD-A125227) Avail: NTIS HC A04/MF A01 CSCL 09/2

The object of this research was to model an actual structure, Bullard Hall, in order to devise a more energy efficient means to control the internal temperature of that structure. The research included a study of all major thermodynamic forces acting on the structure, including solar radiation. Once the model was developed it was compared with the actual structure to determine its usefulness. GRA

N83-27895# Department of Energy, Bartlesville, Okla. Energy Technology Center.
THERMODYNAMICS OF ORGANIC COMPOUNDS Final Report, 1 Oct. 1981 - 30 Sep. 1982
B. E. Gammon and N. K. Smith Nov. 1982 21 p refs
(Grant AF-AFOSR-ISSA-82-00012; AF Proj. 2308)
(AD-A125022; AFOSR-83-0047TR) Avail: NTIS HC A02/MF A01 CSCL 21/5

This research program consisted of an integrated and interrelated effort of basic and applied research in chemical thermodynamics and thermochemistry. Knowledge of variation of physical and thermodynamic properties with molecular structure was used to select compounds for study that because of high ring strain or unusual steric effects may have good energy characteristics per unit volume or per unit mass and thus be useful in the synthesis of high energy fuels. These materials were synthesized, and their thermodynamic properties were evaluated. In cooperation with researcher at Wright-Patterson Air Force Base, ramjet fuels currently in use were subjected to careful thermodynamic evaluation by measurements of heat capacity, enthalpy of combustion and vapor pressure. During the last year of this effort, seven kerosene-type fuels produced by British Petroleum and seven jet fuels produced from shale oil were studied. Author (GRA)

N83-27896# California Univ., Berkeley. Lawrence Berkeley Lab. Nuclear Science Div.
DISCUSSIONS WITH JENS

W. J. Swiatecki Apr. 1982 26 p refs Presented at the Symp. Honouring Jens Lindhand's 60th Birthday, Aarhus, Denmark, 25-26 Feb. 1982
(Contract W-7405-eng-48)
(DE82-016622; LBL-14072; CONF-820252-1) Avail: NTIS HC A03/MF A01

A discussion of special relativity, the liquid drop model of nuclei, Minkowski space, irreversibility, and Jens Lindhand's 60th birthday is presented. DOE

N83-27897# South Carolina Univ., Columbia. College of Engineering.
A GENERAL APPROACH TO THE TESTING OF BINARY SOLUBILITY SYSTEMS FOR THERMODYNAMIC CONSISTENCY. CONSOLIDATED FUEL REPROCESSING PROGRAM
Luther L. Hamm and V. VanBrunt Aug. 1982 405 p refs
(Contract W-7405-eng-26)
(DE83-007173; ORNL/Sub-81-1012/2) Avail: NTIS HC A18/MF A01

The numerical solution to the ordinary differential equation which describes the high-pressure vapor-liquid equilibria of a binary system where one of the components is supercritical and exists as a noncondensable gas in the pure state is considered with emphasis on the implicit Runge-Kuta and orthogonal collocation methods. Some preliminary results indicate that the implicit Runge-Kutta method is superior. Due to the extreme nonlinearity of thermodynamic properties in the region near the critical locus, and extended cubic spline fitting technique is devised for correlating the P-x data. The least-squares criterion is employed in smoothing the experimental data. The technique could easily be applied to any thermodynamic data by changing the endpoint requirements. The volumetric behavior of the systems must be given or predicted in order to perform thermodynamic consistency tests. A general procedure is developed for predicting the volumetric behavior required and some indication as to the expected limit of accuracy is given. DOE

N83-27898# Oak Ridge National Lab., Tenn. Chemical Technology Div.
COORDINATION OF PHYSICAL, CHEMICAL, AND THERMODYNAMIC PROPERTIES FOR COAL CONVERSION: PROCEEDINGS OF THE OAK RIDGE CONFERENCE
Feb. 1983 118 p *refs Conf. held in Oak Ridge, Tenn., 2-4 Jun.* 1982
(Contract W-7405-eng-26)
(DE83-007169; ORNL/TM-8541; CONF-8206158-Summ) Avail: NTIS HC A06/MF A01

The principal results of the conference were: (1) recognition that a centralized data bank of high quality is critical to large-scale coordination of coal conversion work; (2) an agreement that some form of quality assessment of the information to be included in the data bank is necessary; (3) a recommendation to form a National Steering Committee with working groups; and (4) a decision to send a letter on behalf of the conference attendees requesting the organization of a National Steering Committee. The conference organization and the ensuing results are discussed. DOE

N83-27899# Institute of Gas Technology, Chicago, Ill.
CALCULATION OF CALORIFIC VALUE OF COAL/CHAR FROM ITS ULTIMATE ANALYSIS
David M. Mason and Awinash T. Talwalkar 1982 17 p refs Presented at the Coal Testing Conf., Lexington, Ky., 16-17 Feb. 1982
(Contract DE-AC01-76ET-10251)
(DE82-012879; CONF-82043-1) Avail: NTIS HC A02/MF A01

A correlation developed to calculate calorific (heating) value of coal and char from their elemental composition is significantly better than other similar correlations. The correlation was developed by means of regression analysis of a large data bank of US coals. A new correlation was needed because of the more accurate heating value estimation required by engineering calculations around coal conversion reactors. The only previously available correlations did not give satisfactory results when applied to the data bank of US coals. The new correlation resulted in a standard deviation of 129 Btu/lb for all ranks of coal as compared to a range of 139 to 222 Btu/lb for other formulas. The other correlations did not give better results than the new formula, not even on the modified Parr basis that accounts for the pyrite content of coal. Analysis of variances indicated that about 25% of the variance between the observed and calculated values can be accounted for by the variance in the experimental determinations of heating values and elemental composition. The rest may be attributed to the varying maceral and mineral composition and possibly to a lower level of precision of the determinations of the data bank. DOE

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

No abstracts in this category.

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N83-27900# Navy Personnel Research and Development Center, San Diego, Calif.
IMPLEMENTATION OF PLANNED CHANGE: A REVIEW OF MAJOR ISSUES Final Report, 1980 - 1981
John P. Sheposh, Vel N. Hulton, and Gregory A. Knudsen Feb. 1983 52 p refs
(ZF66512001)
(AD-A125193; *NPRDC-TR-83-7*) Avail: NTIS HC A04/MF A01 CSCL 05/1

Pertinent literature was reviewed to provide a perspective for the study of change in organizations. This review focused primarily on the major issues identified in implementing organizational change with special emphasis on the role of management in this process. Based on a review of the findings, it was concluded that implementation can best be understood in functional terms. Several Recommendations are made to aid researchers and practitioners in the investigation, application, and understanding of change processes. Author (GRA)

N83-27901# Georgia Inst. of Tech., Atlanta. Production and Distribution Research Center.
PROJECT SCHEDULING WITH RESOURCE CONSIDERATIONS
L. F. McGinnis May 1982 14 p refs
(Contract N00014-80-K-0709)
(AD-A124938; PDRC-82-16) Avail: NTIS HC A02/MF A01 CSCL 05/1

A great deal of research in activity network based project resource management seems not to have found wide spread adoption. We briefly consider why this is true and pose some new research problems. Based on a broad look at research in project resource management, one fact seems certain. All previous research has focused on a problem paradigm abstracted from its original source. Thus, no consideration is given to the problem environment. This seems to be a fundamental error. Without considering some aspects of the problem environment, how can we develop problem specific tools? Or, how can we develop general tools that will allow the manager or analyst to gain access to the general models and results in a useful and meaningful way? The abstraction from problem environment also has lead us to focus on analysis to the exclusion of synthesis. We've taken the relatively easy analysis problem and solved it in

)reat detail, without any thought to the difficult design problem. GRA

N83-27902# Rolls-Royce Ltd., Derby (England).
NVESTIGATION INTO THE AVAILABILITY LEVELS OF FLEX-BLE PRODUCTION SYSTEMS
-lans-Juergen Warnecke and Ekkehard Gericke 8 Jul. 1982 13 p 'efs Transl. into ENGLISH of Z. fuer Ind. Fertigung (West Ger.), /. 67, 1977 p 683-687
(PNR-90157; Trans-16324/TLT-00895) Avail: NTIS HC A02/MF A01

A simulation program which represents a two-stage production process in a flexible production system is presented. The 'esults of the simulation of a troublefree production process are compared with production during which the machine tools were affected by technical unserviceability. The simulation methods enable the down times of the working positions, of the transfer trolley and other system components to be taken into account, so that the reduction in the utilization levels can be evaluated. Results indicate that utilization factors of a least 80% must be achieved by the working positions before flexible production systems become economical. Digital simulation enables the utilization levels of a production system to be determined at the planning stage. Author (ESA)

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

N83-27903*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MICROCIRCUIT RADIATION EFFECTS DATABANK
Feb. 1983 420 p
(NASA-TM-85346; NAS 1.15:85346) Avail: NTIS HC A18/MF A01 CSCL 05B

Radiation test data submitted by many testers is collated to serve as a reference for engineers who are concerned with and have some knowledge of the effects of the natural radiation environment on microcircuits. Total dose damage information and single event upset cross sections, i.e., the probability of a soft error (bit flip) or of a hard error (latchup) are presented. A.R.H.

N83-27904*# National Aeronautics and Space Administration, Washington, D. C.
NASA STI-RECON BULLETIN AND TECH INFO NEWS
May 1983 4 p
(NASA-CR-172685; NAS 1.26:172685) Avail: NTIS HC A02/MF A01 CSCL 05B

This phamplet is distributed monthly to inform established RECON users about NASA's scientific and technical information projects, products and services. A.R.H.

N83-27905# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DESIGN OF A DISTRIBUTED DATA BASE MANAGEMENT SYSTEM FOR USE IN THE AFIT DIGITAL ENGINEERING LABORATORY M.S. Thesis
Eric F. Imker Dec. 1982 135 p refs
(AD-A124821; AFIT/GCS/EE/82D-21) Avail: NTIS HC A07/MF A01 CSCL 09/2

Distributed data base management system (DDBMS) was designed with the goal of providing the AFIT School of Engineering a research tool. The objective was to use state-of-the-art knowledge in a design that would provide an experimental testbed to further advance DDBMS knowledge. Toward this goal, an extensive investigation was made into distributed data base systems. Numerous alternatives were presented in the areas of configurations and architecture, data allocation, directory management, query processing, concurrency control, reliability, integrity and security. This background discussion includes advantages and disadvantages of the alternatives. A top level system design was presented which includes replication of data, a universal data model and query language, a centralized and extended centralized directory system and the majority voting concurrency control algorithm. Due to the complexity and size of the development effort, a detailed design of only the directory system was made in this research effort. Follow-on development efforts over the next few years will be required to complete this research project. Author (GRA)

N83-27906# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
SPELLING CORRECTION IN USER INTERFACES Interim Report
Ivor Durham, David A. Lamb, and James B. Saxe 20 Dec. 1982 27 p
(Contracts N00014-76-C-0370; F33615-81-K-1539)
(AD-A125208; CMU-CS-82-151) Avail: NTIS HC A03/MF A01 CSCL 09/4

This paper demonstrates the feasibility of providing a spelling corrector in most interactive user interfaces. The issues in using spelling correction in a user interface are examined and a simple correction algorithm is described. The authors describe the results of an experiment in which the corrector is incorporated into a heavily used interactive program. More than one quarter of the errors made by users during the experiment were corrected using our simple mechanisms. From this it is concluded that there are considerable benefits and few obstacles to providing a spelling corrector in almost any interactive user interface. GRA

N83-27907# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
DEVELOPMENT OF A QUERY PROCESSOR FOR A BACK-END MULTIPROCESSOR RELATIONAL DATABASE COMPUTER M.S. Thesis
William R. Rogers Dec. 1982 149 p refs
(AD-A124885; AFIT/GCS/EE/82D-30) Avail: NTIS HC A07/MF A01 CSCL 09/2

A Query Processor for a back-end multiprocessor relational database computer has been defined. An existing high level design for the proposed database computer was used to define the context, and that proposal was reviewed. An abstraction of the original proposal was developed so that a more general design approach could be taken. A requirements analysis for the query processor was performed. This analysis was carried to the lowest level possible without fixing any implementation details. Flexibility in defining the data manipulation language was obtained. A general design is presented that should be applicable to the development of a prototype of the entire database computer. The general nature of this design should make the concept very portable. The interfaces to the rest of the computer have been segregated into four modules to minimize the changes needed for portability. Author (GRA)

N83-27908# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
CONCEPTS EVALUATION MODEL V INPUT-DATA SYSTEM M.S. Thesis
John D. Hightower Dec. 1982 130 p refs
(AD-A124891; AFIT/GCS/EE/82D-18) Avail: NTIS HC A07/MF A01 CSCL 09/2

A systems analysis was performed on the Threat Force File development process used in conjunction with the Concepts Evaluation Model (CEM V) at the United States Army Concepts Analysis Agency. Additionally, logical subject databases were designed to facilitate the retrieval of specific information from the output generated by the CEM V. A systematic approach provided the focus for resolutionof each activity. The resulting systems analysis documents the activities and processes that the agency's four major study teams go through in preparing the Threat Force File for input to the CEM V. Areas were identified for application

of data management techniques to improve system efficiency. The database designs resulted from the application of techniques selected from existing design methodologies. The logical schemas were transformed into network structures consistent with the database management system (DMS-1100) used by USACAA. GRA

N83-27909# Massachusetts Inst. of Tech., Cambridge. Dept. of Electrical Engineering and Computer Science.
QUERY OPTIMIZATION IN DISTRIBUTED DATABASES Ph.D. Thesis
Kuan-Tsae Huang Oct. 1982 207 p refs
(Contract N00014-77-C-0532; NR Proj. 041519)
(AD-A124921; LIDS-TH-1247) Avail: NTIS HC A10/MF A01 CSCL 12/1

Distributed database management systems (DDBMS) are amongst the most important and successful software developments in this decade. They are enabling the computing power and data to be placed within the user environment close to the point of user activities. The performance efficiency of DDBMS is deeply related to the query processing strategies involving data transmission over different nodes through the network. This thesis is to study the optimization of query processing strategies in a distributed databases environment. With the objective of minimum communication cost, we have developed a mathematical model to find a join-semijoin program for processing a given equi-join query in distributed homogeneous relational databases. Rules for estimating the size of the derived relation is proposed. The distributed query processing problem is formulated as dynamic network problem. We also extend this model to consider both communication cost and local processing cost. We extend this model to query processing in a distributed heterogeneous databases environment. A heterogeneous database communication system is proposed to integrate heterogeneous database management systems to combine and share information. The use of a database communication system for heterogeneous DBMSs makes the overall system transparent to users from an operational point of view. Problems of schema translation and query translation of the query processing in this environment are studied. GRA

N83-27910# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering..
THE PERFORMANCE MEASUREMENT OF A RELATIONAL DATABASE SYSTEM USING MONITORING AND MODELING TECHNIQUES M.S. Thesis
Gary L. Snyder 15 Dec. 1982 145 p refs
(AD-A124919; AFIT/GCS/EE/82D-33) Avail: NTIS HC A07/MF A01 CSCL 09/2

An investigation was conducted to provide a productive means of measuring the effectiveness of a collection of untested relational algebra query optimization techniques which are integrated within an existing microprocessor resident relational database. As a result of this research, two methods of performance measurement were proposed. A software monitor was designed, coded, and tested specifically to determine if the employed optimization methods actually descrease the amount of processing time required to execute a given query. Additionally, a baseline simulation model was designed and presented as an alternative means of analyzing the performance of this optimization logic. GRA

N83-27911# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A BACKEND DATA BASE SYSTEM FOR THE EGLIN COMPUTER NETWORK M.S. Thesis
Joseph L. Self Nov. 1982 167 p refs
(AD-A124908; AFIT/GCS/EE/82D-32) Avail: NTIS HC A08/MF A01 CSCL 09/2

The Directorate of Computer Sciences at Eglin AFB is in the process of upgrading its computer system to meet increased future requirements. Their upgrade includes a revision of the data base query capabilities to handle a projected larger on-line data base capability. A backend data base computer system was investigated as a possibility for meeting the anticipated increase in data base queries. A systems analysis of the Eglin Computer Network's (ECONET) current data base query workload was accomplished to determine a baseline for future workload projections. A modified Multi-backend Data Base System (MDBS developed by David Hsiao) design was then incorporated into the ECONET and simulated with numerous structural and parametric variations. The parametric variations were to measure performance changes due to changes in workloads and the types of jobs processed. The structural variations were made to measure performance changes caused by changes in hardware configurations. The simulation results were used to select a final backend configuration that, hopefully, would best meet the requirements of data base processing on the ECONET. A MDBS-like configuration with three backend processors was chosen. Author (GRA)

N83-27912# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
THE CONTINUED DESIGN AND IMPLEMENTATION OF A RELATIONAL DATABASE SYSTEM M.S. Thesis
Linda M. Rodgers Dec. 1982 191 p refs
(AD-A124927; AFIT/GCS/EE/82D-29) Avail: NTIS HC A09/MF A01 CSCL 09/2

The Roth Relational Database System is a database system designed and implemented for teaching and research purposes at the Air Force Institute of Technology. During this thesis effort, an investigation into the design and implementation of the Roth Relational Database System is made in order to continue the design and implementation of the AFIT Relational Database System. Additional research was done to assess the feasibility of suggestions made by Roth concerning the continued development of the system. Specifically, an investigation was made concerning Theo Haerder's access structure and an investigation was made concerning the interface between the editor and the low level access mechanism. With this research accomplished, a top down structured design was completed for the edit functions and the low level access structure. Once this was accomplished an algorithm was developed, implemented and tested for the insertion and deletion of values into a B-tree. Author (GRA)

N83-27913# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
AUTOMATIC THRESHOLD DESIGN FOR A BOUND DOCUMENT SCANNER M.S. Thesis
Bill James Stanton, Jr. Dec. 1982 223 p refs
(AD-A125316; AFIT-CI-NR-82-71T) Avail: NTIS HC A10/MF A01 CSCL 17/2

Research was carried out on an electro-optical bound document scanner using a charge-coupled device (CCD) as a sensing element. The goal was to develop a means whereby the voltage threshold level of the video analog-to-digital converter could be set automatically to provide optimum hard-copy output over a range of lighting conditions and document background colors and qualities. To determine an acceptable component of the analog video signal as a thresholding reference, an extensive study of the signal behavior was conducted over a variety of conditions. An Automatic Threshold Control (ATC) was designed that exploited the modulation transfer function of the CCD's analog signal. A CALIBRATION PATTERN is superimposed at the left-hand margin of the page being scanned. This pattern contains various discrete spatial frequencies. The threshold voltage is varied automatically until the number of black/white (zero/one) transitions is maximized for the CALIBRATION PATTERN. The threshold voltage producing this maximum number of transitions is equivalent to the threshold required to produce optimum resolution in the scanner hard-copy output. This threshold value is then locked in for the duration of the page being scanned. GRA

N83-27914# Oak Ridge National Lab., Tenn. Information Div.
DOCUMENTING CONTENT OF TECHNICAL DATABASES
W. Bruce Ewbank 1982 15 p Presented at the ACM/SIGMOD Intern. Conf. on Management of Data, Orlando, Fla., 2-4 Jun. 1982
(Contract W-7405-eng-26)
(DE82-017526; CONF-820616-2) Avail: NTIS HC A02/MF A01

Much effort has been spent on the design of computer systems which can help manage scientific or technical data collections. There has been little concern with designing high quality into the contents of a technical database, nor even with developing criteria by which the relative quality of databases can be compared. A set of topics which should be considered during the construction of any technical database is suggested. The ability of a database to provide information which is satisfactory for a given application is determined by the approach the database builders have taken to each topic. The database builders can also use the list of topics for systematic communication with users and potential users about the strengths and limitations of database content. The extent to which the topics are addresed can be used together with the description for each topic to develop a measure for the quality of any technical database. DOE

N83-27915# Oak Ridge National Lab., Tenn.
DATABASE AUTOMATION OF ACCELERATOR OPERATION
B. J. Casstevens and C. A. Ludemann 1982 19 p Presented at the Natl. Computer Conf., Houston, Tex., 7 Jun. 1982
(Contract W-7405-eng-26)
(DE82-017525; CONF-820606-4) Avail: NTIS HC A02/MF A01

The Oak Ridge Isochronous Cyclotron (ORIC) is a variable energy, multiparticle accelerator that produces beams of energetic heavy ions which are used as probes to study the structure of the atomic nucleus. To accelerate and transmit a particular ion at a specified energy to an experimenter's apparatus, the electrical currents in up to 82 magnetic field producing coils must be established to accuracies of from 0.1 to 0.001 percent. Mechanical elements must also be positioned by means of motors or pneumatic drives. A mathematical model of this complex system provides a good approximation of operating parameters required to produce an ion beam. However, manual tuning of the system must be performed to optimize the beam quality. The database system was implemented as an on-line query and retrieval system running at a priority lower than the cyclotron real-time software. It was designed for matching beams recorded in the database with beams specified for experiments. The database is relational and permits searching on ranges of any subset of the eleven beam categorizing attributes. A beam file selected from the database is transmitted to the cyclotron general control software which handles the automatic slewing of power supply currents and motor positions to the file values, thereby replicating the desired parameters. DOE

N83-27916# Florida Univ., Gainesville. Database Systems Research and Development Center.
SAM: A SEMANTIC ASSOCIATION MODEL FOR CORPORATE AND SCIENTIFIC/STATISTICAL DATABASE
Stanley Y. W. Su Dec. 1982 75 p refs
(Contract DE-AS05-81ER-10977)
(DE83-006510; DOE/ER-10977/T3) Avail: NTIS HC A04/MF A01

A semantic association model called SAM which is designed for modeling scientific/statistical databases and business oriented data bases is described. The model uses conepts and associations of these concepts to model the real world information of a data base management environment. Seven general association types are defined and distinguished based on their structural properties, operational characteristics and semantic constraints. The model is characterized by: (1) its expressive power offered by the seven modeling constructs and the recursive use and nested structuring of these constructs; (2) its recognition of complex data types such as text, ordered set, matrix, time series, vector, set and time as primitive data types which can be directly manipulated by the user using a DMI; (3) its support of principle of relativism by allowing concepts to be multiply labeled to explicitly specify the conflicting views of these concepts; and (4) the distinction it makes on attributes which characterize objects and attributes which statistically summarize a set of objects, and its support of statistical operations. A network structure and a tabular structure called generalized relation or G-relation are proposed for representing the conceptual and implementation designs of databases respectively. A number of restructuring operations and algebraic operations are defined for processing G-relations. DOE

N83-27917# Florida Univ., Gainesville. Database Systems Research and Development Center.
INDEX ENCODING: A COMPRESSION TECHNIQUE FOR LARGE STATISTICAL DATABASES
D. S. Batory 1982 34 p refs
(Contract DE-AC05-81ER-10977)
(DE83-006431; DOE/ER-10977/T2) Avail: NTIS HC A03/MF A01

Index encoding which is a compression technique which involves the substitution of numeric codes for data values is outlined. Current methods of index encoding are suited only for attributes whose domains are enumerable and static. Generalizations of these methods to encode dynamic domains are proposed and analyzed. The practicality of the generalizations is examined in both theoretical and experimental studies. DOE

N83-27918# Florida Univ., Gainesville. Database Systems Research and Development Center.
METHODOLOGY FOR VIEW INTEGRATION IN LOGICAL DATABASE DESIGN
Shamkant B. Navathe and Suresh G. Gadgil (Metropolitan Life, New York) 1982 23 p refs Presented at the 8th Intern. Conf. on Very Large Data Base, Mexico City, 8 Sep. 1982
(Contract DE-AC05-81ER-10977)
(DE83-005754; CONF-820984-2) Avail: NTIS HC A02/MF A01

A conceptual framework for the design of data bases consisting of view modeling, view integration, schema analysis and mapping and physical design and optimization is discussed. View modeling involves the modeling of the user views using a conceptual/semantic data model; the view integration phase merges user views into a global model which is then mapped to an existing data base environment and subsequently optimized. The data model proposed by Navathe and Schkolnick to model user views and develop a methodology for view integration was applied. View integration issues are examined; operations for merging views are defined and an approach to automation of the view integration process is described. DOE

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

No abstracts in this category.

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

N83-27919# Committee on Appropriations (U. S. House).
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT-INDEPENDENT AGENCIES APPROPRIATION ACT, 1984
Washington GPO 1983 43 p H.R. 3133 enacted into law by the 98th Cong., 1st Sess., 6 Jun. 1983
Avail: US Capitol, Senate Document Room

Budget appropriations for the National Science Foundation, the National Aeronautics, and the Department of Housing and Urban Development-Independent Agencies are presented. For individual titles, see N83-27920 through N83-27920.

N83-27920# Committee on Appropriations (U. S. House).
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT-INDEPENDENT AGENCIES APPROPRIATION ACT, 1984: NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
In its Dept. of Housing and Urban Develop.-Independent Agencies

Appropriation Act, 1984 1983 p 20-22 (For primary document see N83-27919 16-84)
Avail: US Capitol, Senate Document Room

The NASA budget appropriations for FY 1983 are presented for the following areas: research and development, space transportation system, space station, space telescope, launch vehicles, space communication, TDR satellites, facility construction, and project management. B.G.

N83-27921# Committee on Commerce, Science, and Transportation (U. S. Senate).
NASA AUTHORIZATION FOR FISCAL YEAR 1984
Washington GPO 1983 227 p Hearing before the Subcomm. on Sci., Technol. and Space of the Comm. on Com., Sci. and Transportation, 98th Congr., 1st Sess., 8, 9, 15 Mar. 1983
(GPO-19-200) Avail: Subcommittee on Science, Technology and Space

Fiscal year 1984 authorization for NASA are developed in recognition of the close relationship between civilian and defense aeronautical and space activities. Author

N83-27922# RAND Corp., Santa Monica, Calif.
AFTER ENERGY PRICE DECONTROL: THE ROLE OF GOVERNMENT CONSERVATION PROGRAMS
Stanley M. Besen and Leland L. Johnson Oct. 1982 61 p refs
(Contract DE-AC01-80PE-70269)
(RAND/N-1903-DOE) Avail: NTIS HC A04/MF A01

Energy conservation and price distortions, government intervention in response to price distortions, and the government role in a regime of correct prices are discussed. Author

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

N83-27923*# Cummins Engine Co., Inc., Columbus, Ind.
THE CUMMINS ADVANCED TURBOCOMPOUND DIESEL ENGINE EVALUATION
John L. Hoehne and John R. Werner Dec. 1982 46 p ref Sponsored by NASA
(Contracts DE-AC02-78CS-54936; DE-AI01-80CS-50194)
(NASA-CR-168042; NAS 1.26:168042; CTR-0747-82002) Avail: NTIS HC A03/MF A01 CSCL 13F

An advanced turbocompound diesel engine program was initiated to improve the tank mileage of the turbocompound engine by 5% over the vehicle test engines. Engine improvements could be realized by increasing the available energy of the exhaust gas at the turbine inlet, incorporating gas turbine techniques into improving the turbomachinery efficiencies, and through refined engine system optimization. The individual and cumulative performance gains achieved with the advanced turbocompound engine improvements are presented. Author

N83-27924*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
DOE/NASA AUTOMOTIVE STIRLING ENGINE PROJECT OVERVIEW '83
Donald G. Beremand [1982] 17 p refs Presented at the 18th Intersoc. Energy Conversion Eng. Conf., Orlando, Fla., 21-26 Aug. 1983
(Contract DE-AI01-77CS-51040)
(NASA-TM-83405; E-1683; NAS 1.15:83405;
DOE/NASA/51040-48) Avail: NTIS HC A02/MF A01 CSCL 13F

An overview of the DOE/NASA Automotive Stirling Engine Project is presented. The background and objectives of the project are reviewed. Project activities are described and technical progress and status are presented and assessed. Prospects for achieving the objective 30% fuel economy improvement are considered good. The key remaining technology issues are primarily related to life, reliability and cost, such as piston rod seals, and low cost heat exchanges. Author

N83-27925*# Mechanical Technology, Inc., Latham, N. Y. Stirling Engine Systems Div.
AUTOMOTIVE STIRLING ENGINE DEVELOPMENT PROGRAM Semiannual Technical Progress Report, 1 Jul. - 31 Dec. 1982
N. Nightingale, W. Ernst, A. Richey, M. Simetkosky, G. Smith, and M. Antonelli, ed. Jan. 1983 61 p
(Contracts DEN3-32; EC-77-A-31-10040)
(NASA-CR-168074; NAS 1.26:168074; Rept-83-ASE-308-SA-3; SATPR-3) Avail: NTIS HC A04/MF A01 CSCL 13F

Mod I engine testing and test results, the test of a Mod I engine in the United States, Mod I engine characterization and analysis, Mod I Transient Test Bed fuel economy, Mod I-A engine performance are discussed. Stirling engine reference engine manufacturing and reduced size studies, components and subsystems, and the study and test of low-cost casting alloys are also covered. The overall program philosophy is outlined, and data and results are presented. J.M.S.

N83-27926*# Booz-Allen and Hamilton, Inc., Bethesda, Md. Transportation Consulting Div.
DEMONSTRATION AND EVALUATION OF GAS TURBINE TRANSIT BUSES Final Report, Jan. 1978 - Jun. 1981
Jun. 1983 78 p
(Contracts DEN3-142; EC-77-A-31-1044)
(NASA-CR-165528; DOE/NASA/0142-83/1; NAS 1.26:165528; GT-83-001) Avail: NTIS HC A05/MF A01 CSCL 13F

The Gas Turbine Transit Bus Demonstration Program was designed to demonstrate and evaluate the operation of gas turbine engines in transit coaches in revenue service compared with diesel powered coaches. The main objective of the program was to accelerate development and commercialization of automotive gas turbines. The benefits from the installation of this engine in a transit coach were expected to be reduced weight, cleaner exhaust emissions, lower noise levels, reduced engine vibration and maintenance requirements, improved reliability and vehicle performance, greater engine braking capability, and superior cold weather starting. Four RTS-II advanced design transit coaches were converted to gas turbine power using engines and transmissions. Development, acceptance, performance and systems tests were performed on the coaches prior to the revenue service demonstration. Author

N83-27927# R and D Associates, Marina Del Rey, Calif.
CONCEPT EVALUATION OF AUTOMOTIVE PROPULSION USING LIQUID AIR/NITROGEN Final Report
J. L. Dooley and R. P. Hammond 1982 156 p refs
(Contract DE-AC01-81ER-30011)
(DE82-016992; RDA-TR-18700-003) Avail: NTIS HC A08/MF A01

A technical and economic assessment is made of an automotive powerplant system using cryogenic liquid air or nitrogen as the working fluid. In an open Rankine cycle the cold fluid is stored at atmospheric pressure; as needed for use, small quantities are pressurized and heated to high temperature before expanding in a multistage engine that drives the vehicle. A range of gas pressures and temperatures and different expansion stages and reheat variations were evaluated to give a complete thermodynamic profile of the system. One possible design of each component in the power train is shown, and the sizes, weights and probable manufacturing cost estimated. Installation of these components in a passenger ehicle of conventional size is shown to be feasible. The assessment shows that a liquid nitrogen powered vehicle could be generally competitive with current gasoline automobiles in performance, weight, range and operating cost without using imported fuel and without harmful emissions. DOE

88 SPACE SCIENCES (GENERAL)

N83-27928*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
NASA/GODDARD SPACE FLIGHT CENTER CONTRIBUTIONS TO THE WORKSHOP ON POSITRON-ELECTRON PAIRS IN ASTROPHYSICS
R. Ramaty Mar. 1983 62 p refs Submitted for publication (NASA-TM-85027; NAS 1.15:85027) Avail: NTIS HC A04/MF A01 CSCL 03B

Topics address positron-electron pair production and annihilation phenomena in various astrophysical sources including galaxies and galactic nuclei, neutron stars, and cosmic background radiation. For individual titles, see N83-27929 through N83-27937.

N83-27929*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
AN ELECTRON-POSITRON JET MODEL FOR THE GALACTIC CENTER **c90**
M. L. Burns (Maryland Univ.) *In its* NASA/Goddard Space Flight Center Contrib. to the Workshop on Positron-Electron Pairs in Astrophys. Mar. 1983 p 1-6 refs (For primary document see N83-27928 16-88)
Avail: NTIS HC A04/MF A01 CSCL 03B

High energy observations of the galactic center on the subparsec scale seem to be consistent with electron-positron production in the form of relativistic jets. These jets could be produced by an approximately 1,000,000 solar mass black hole dynamo transportating pairs away from the massive core. An electromagnetic cascade shower would develop first from ambient soft protons and then nonlinearly; the shower using itself as a scattering medium. This is suited to producing, cooling and transporting pairs to the observed annihilation region. It is possible the center of our galaxy is a miniature version of more powerful active galactic nuclei that exhibit jet activity. M.G.

N83-27930*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
COMPARISON OF PHOTON-PHOTON AND PHOTON-MAGNETIC FIELD PAIR PRODUCTION RATES **c90**
M. L. Burns (Maryland Univ.) and A. K. Harding *In its* NASA/Goddard Space Flight Center Contrib. to the Workshop on Positron-Electron Pairs in Astrophys. Mar. 1983 p 7-12 refs (For primary document see N83-27928 16-88)
Avail: NTIS HC A04/MF A01 CSCL 03B

Neutron stars were proposed as the site of gamma-ray burst activity and the copious supply of MeV photons admits the possibility of electron-positron pair production. If the neutron star magnetic field is sufficiently intense (> 10 to the 12th power G), both photon-photon (2 gamma) and photon-magnetic field (gamma) pair production should be important mechanisms. Rates for the two processes were calculated using a Maxwellian distribution for the photons. The ratio of 1 gamma to 2 gamma pair production rates was obtained as a function of photon temperature and magnetic field strength. M.G.

N83-27931*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PAIR PRODUCTION AND ANNIHILATION IN STRONG MAGNETIC FIELDS **c90**
J. K. Daugherty (North Carolina Univ.) and A. K. Harding *In its* NASA/Goddard Space Flight Center Contrib. to the Workshop on Positron-Electron Pairs in Astrophys. Mar. 1983 p 13-26 refs (For primary document see N83-27928 16-88)
Avail: NTIS HC A04/MF A01 CSCL 03B

Electromagnetic phenomena occurring in the presence of strong magnetic fields are currently of great interest in high-energy astrophysics. In particular, the process of pair production by single photons in the presence of fields of order 10 to the 12th power Gauss is of importance in cascade models of pulsar gamma ray emission, and may also become significant in theories of other radiation phenomena whose sources may be neutron stars (e.g., gamma ray bursts). In addition to pair production, the inverse process of pair annihilation is greatly affected by the presence of superstrong magnetic fields. The most significant departures from annihilation processes in free space are a reduction in the total rate for annihilation into two photons, a broadening of the familiar 511-keV line for annihilation at rest, and the possibillity for annihilation into a single photon (which dominates the two-photon annihilation for B (> 10 the 13th power Gauss). The physics of these pair conversion processes, which is reviewed briefly, can become quite complex in the teragauss regime, and can involve calculations which are technically difficult to incorporate into models of emission mechanisms in neutron star magnetospheres. However, theoretical work, especially the case of pair annihilation, also suggests potential techniques for more direct measurements of field strengths near the stellar surface. M.G.

N83-27932*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LOW-TEMPERATURE POSITRON ANNIHILATION **c93**
Richard J. Drachman *In its* NASA/Goddard Space Flight Center Contrib. to the Workshop on Positron-Electron Pairs in Astrophys. Mar. 1983 p 27-38 refs (For primary document see N83-27928 16-88)
Avail: NTIS HC A04/MF A01 CSCL 03B

For a satisfactory understanding of astrophysical annihilation radiation, especially that observed from the galactic center direction, the interaction of positrons with the ambient medium must be carefully investigated. Although hot, ionized regions may be important sources of annihilation radiation, the simpler processes occurring in low-temperature neutral hydrogen gas are mainly addressed. The goal is to set limits on conditions in the annihilation region by using the predictions of atomic theory compared with the observed gamma-ray line width, continuum strength and time dependence. M.G.

N83-27933*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
UPPER LIMITS TO THE ANNIHILATION RADIATION LUMINOSITY OF CENTAURUS A **c89**
N. Gehrels, T. L. Cline, W. S. Paciesas, B. J. Teegarden, J. Tueller, P. Dirouchoux (Centre d'Etudes Nucleaires de Saclay), and J. M. Hameury (Centre d'Etudes Nucleaires de Saclay) *In its* NASA/Goddard Space Flight Center Contrib. to the Workshop on Positron-Electron Pairs in Astrophys. Mar. 1983 p 39-44 refs (For primary document see N83-27928 16-88)
Avail: NTIS HC A04/MF A01 CSCL 03A

A high resolution observation of the active nucleus galaxy Centaurus A (NGC 5128) was made by the GSFC low energy gamma-ray spectrometer (LEGS) during a balloon flight on 1981 November 19. The measured spectrum between 70 and 500 keV is well represented by a power law of the form 1.05 x 10 (-4) (E/100 keV) (-1.59) ph/sq cm /s with no breaks or line features observed. The 98% confidence (2 sigma) flux upper limit for a narrow (< 3 keV) 511-keV positron annihilation line is 9.9 x 10 (-4) ph/ sq cm /s. Using this upper limit, the ratio of the narrow-line annihilation radiation luminosity to the integral > or = 511 keV luminosity is estimated to be < 0.09 (2 sigma upper limit). This is compared with the measured value for our galactic center in the Fall of 1979 of 0.10 to 0.13, indicating a difference in he emission regions in the nuclei of the two galaxies. M.G.

N83-27934*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PAIR PRODUCTION NEAR THRESHOLD IN PULSAR MAGNETIC FIELDS **c90**
A. K. Harding and J. K. Daugherty (North Carolina Univ.) *In its* NASA/Goddard Space Flight Center Contrib. to the Workshop on Positron-Electron Pairs in Astrophys. Mar. 1983 p 45-49 refs (For primary document see N83-27928 16-88)
Avail: NTIS HC A04/MF A01 CSCL 03B

In pulsar polar cap models, curvature radiation gamma rays produce e(+)e(-) pairs in the strong magnetic fields near the

surface of the neutron star. While these gamma rays have energies E sub gamma > > mc(2), they also propagate at very small angles to the fields, such that the threshold condition, E gamma > 2mc(2)/sin theta is just barely satisfied when they pair produce. Threshold effects on the pair production attenuation coefficient, which are due to the discreteness of the e(+)e(-) Landau states, must therefore be considered when computing the mean free paths of curvature radiation photons in pulsar magnetic fields. These effects, which are not incorporated in the asymptotic expression for the attenuation coefficient, have some interesting consequences for pulsar models. Since pair production is suppressed near threshold, the photon mean free paths are longer than previously thought. In magnetic fields approximately > 6x10 approximately >G, the pairs tend to be produced in the ground state Landau level and will not synchrotron radiate. Since synchrotron radiation is an essential ingredient in the electromagnetic cascades which produce low energy pairs above the acceleration region, pulsars with very high magnetic fields may not produce many pairs. M.G.

N83-27935*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ELECTRON-POSITRON ANNIHILATION AND THE COSMIC X-RAY BACKGROUND **c93**
Demosthenes Kazanas (Maryland Univ.) and Richard Arrick Shafer (Maryland Univ.) *In its* NASA/Goddard Space Flight Center Contrib. to the Workshop on Positron-Electron Pairs in Astrophys. Mar. 1983 p 51-55 refs (For primary document see N83-27928 16-88)
Avail: NTIS HC A04/MF A01 CSCL 03B

The possibility that the processes responsible for the cosmic X-ray background (CXB) would also produce an e(-)-e(+) annihilation feature is examined. Under the assumption that these proesses are thermal, the absence of a strong e(-)-e(=) annihilation feature places constraints on the compactness (L/R ratio) of these sources. Observations favor souces of small compactness ratio. Author

N83-27936*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE ORIGIN OF THE GALACTIC ANNIHILATION RADIATION **c90**
R. E. Lingenfelter (California Univ.) and R. Ramaty *In its* NASA/Goddard Space Flight Center Contrib. to the Workshop on Positron-Electron Pairs in Astrophys. Mar. 1983 p 57-62 refs (For primary document see N83-27928 16-88)
(Grant NsG-7541)
Avail: NTIS HC A04/MF A01 CSCL 03B

Observations of the e(+)-e(-) annihilation radiation from the galactic center are reviewed and the implications of these and other observations on the positron production process, the annihilation region and the fundamental nature of the galactic center source are discussed. M.G.

N83-27937*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
CRITERIA FOR GRASAR ACTION IN ASTROPHYSICAL SOURCES **c90**
J. M. McKinley (Maryland Univ.) and R. Ramaty *In its* NASA/Goddard Space Flight Center Contrib. to the Workshop on Positron-Electron Pairs in Astrophys. Mar. 1983 p 63-67 refs (For primary document see N83-27928 16-88)
Avail: NTIS HC A04/MF A01 CSCL 03B

The theory of gamma ray amplification through stimulated annihilation radiation (grasar) was developed by Ramaty, McKinley and Jones. For gamma ray bursts similar to the March 5, 1979 burst, an observed annihilation line of width < 0.03 MeV would imply a grasar source. The minimum pair density needed for the onset of grasar action is approx. 10 to the 30th power/cu cm and the peak of the grasar line, without a gravitational redshift, is at < 0.5 MeV. M.G.

N83-27938*# Lunar Science Inst., Houston, Tex.
CONFERENCE ON PLANETARY VOLATILES
Robert O. Pepin, comp. and Richard OConnell, comp. 1982 215 p refs Conf. held in Alexandria, Minn., 9-12 Oct. 1982
(NASA-CR-172682; NAS 1.26:172682; LPI-TR-83-01) Avail: NTIS HC A10/MF A01 CSCL 03B

Initial and present volatile inventories and distributions in the Earth, other planets, meteorites, and comets; observational evidence on the time history of volatile transfer among reservoirs; and volatiles in planetary bodies, their mechanisms of transport, and their relation to thermal, chemical, geological and biological evolution are addressed. Author

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N83-27939*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
LARGE DEPLOYABLE REFLECTOR SCIENCE AND TECHNOLOGY WORKSHOP. VOLUME 2: SCIENTIFIC RATIONALE AND TECHNOLOGY REQUIREMENTS
David Hollenbach, ed. Jun. 1983 70 p refs Workshop held at Pacific Grove, Calif., 21-25 Jun. 1982
(NASA-CP-2275; T-5349; NAS 1.55:2275) Avail: NTIS HC A04/MF A01 CSCL 03A

The scientific rationale for the large deployable reflector (LDR) and the overall technological requirements are discussed. The main scientific objectives include studies of the origins of planets, stars and galaxies, and of the ultimate fate of the universe. The envisioned studies require a telescope with a diameter of at least 20 m, diffraction-limited to wavelengths as short as 30-50 micron. In addition, light-bucket operation with 1 arcsec spatial resolution in the 2-4 microns wavelength region would be useful in studies of high-redshifted galaxies. Such a telescope would provide a large increase in spectroscopic sensitivity and spatial resolving power compared with existing or planned infrared telescopes. Author

N83-27940# University Coll., Cardiff (Wales). Dept. of Applied Mathematics and Astronomy.
THE EXTINCTION OF STARLIGHT AT WAVELENGTHS NEAR 2200A. THE 2.8 TO 3.6 MICRON SPECTRA OF MICRO-ORGANISMS WITH VARYING H2O-ICE CONTENT
F. Hoyle, N. C. Wickramasinghe, and N. L. Jabir Feb. 1983 23 p refs Submitted for publication
(Preprint-85) Avail: NTIS HC A02/MF A01

The nature of interstellar grains is discussed. Infrared and ultraviolet absorption data which support bacterial models of grain structure are presented. For individual titles, see N83-27941 through N83-27942.

N83-27941# University Coll., Cardiff (Wales). Dept. of Applied Mathematics and Astronomy.
THE EXTINCTION OF STARLIGHT AT WAVELENGTHS NEAR 2200A
F. Hoyle, N. C. Wickramasinghe, and N. L. Jabir *In its* The Extinction of Starlight at Wavelengths near 2200A. The 2.8 to 3.6 Micron Spectra of Micro-Organisms with Varying H2O-Ice Content Feb. 1983 13 p ref (For primary document see N83-27940 16-89)
Avail: NTIS HC A02/MF A01

The extinction of starlight at wavelengths near 2200 A by small grains of magnesium oxide rather than by graphite is discussed. The potential ability of graphite to produce ultraviolet extinction is shown to be an order of magnitude greater than the extinction which MgO grains can produce under the most favorable assumptions concerning the effectiveness of O2- transitions.
Author (ESA)

N83-27942# University Coll., Cardiff (Wales). Dept. of Applied Mathematics and Astronomy.
THE 2.8 TO 3.6 MICRON SPECTRA OF MICRO-ORGANISMS WITH VARYING H2O-ICE CONTENT
F. Hoyle, N. C. Wickramasinghe, and N. L. Jabir *In its* The Extinction of Starlight at Wavelengths near 2200A. The 2.8 to 3.6 Micron Spectra of Micro-Organisms with Varying H2O-Ice Content Feb.

1983 10 p refs (For primary document see N83-27940 16-89)
Avail: NTIS HC A02/MF A01

The extinction curves of bacterial grains on which variable mass fractions of water-ice are condensed were calculated in order to assess the infrared properties of grains in dense interstellar molecular clouds. Because the ice band at 3.07 microns is stronger by a factor of several tens of thousands than the OH and CH stretching bands in organic materials, even a small mass fraction of ice condensed inside or on the surface of the particles modifies and tends to obscure the characteristic biological signature at 3.4 microns. Author (ESA)

N83-27943# Los Alamos Scientific Lab., N. Mex.
BUMP MASSES FOR BL Her STARS
Cecil G. Davis 1982 6 p refs Presented at the Conf. on Pulsating Stars, Boulder, Colo., 1-4 Jun. 1982 Submitted for publication
(Contract W-7405-eng-36)
(DE83-019564; LA-UR-82-2008; CONF-8206101-2) Avail: NTIS HC A02/MF A01

The masses of classical Cephieds are determined by using the phase of the Hertzsprung bump on the light or velocity curve, Cox-Stewart opacities, and nonlinear pulsation theory. The light curve for BL Her, a population II Cepheid, is calculated with an observed bump on the declining portion of its light curve. The nonlinear hydrodynamic model used resolves the light curve by dynamic zoning nd allows the opportunity to make a direct comparison of the calculated light curve to the observations, using a prescribed mass, luminosity, and effective temperature. The parameters for BL Her are from a linear model that has nearly the correct period and the correct period ratio from resonance theory for a bump to appear on the declining portion of the light curve as observed. These parameters are: M = 0.55 M, L = 95.0 L, and Γ sub eff. = 6500 K. The model results agree well with the observations and the color-Γ sub eff relation has the same slope as that observed for RR Lyrae stars. DOE

N83-27944# University Coll., Cardiff (Wales). Dept. of Applied Mathematics and Astronomy.
INTERSTELLAR PROTEINS AND THE DISCOVERY OF A NEW INTERSTELLAR ABSORPTION FEATURE AT LAMBDA = 2800A
L. M. Karim, F. Hoyle, and N. C. Wickramasinghe Mar. 1983 17 p refs Submitted for publication
(Preprint-86) Avail: NTIS HC A02/MF A01

The ultraviolet absorption spectra of three early-type stars were examined in order to detect the presence of biochemical material in interstellar matter. Excess absorption (over graphite) at 2800A is consistent with significant concentrations of tryptophan in the absorbing grains. Author (ESA)

N83-27933*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
UPPER LIMITS TO THE ANNIHILATION RADIATION LUMINOSITY OF CENTAURUS A
N. Gehrels, T. L. Cline, W. S. Paciesas, B. J. Teegarden, J. Tueller, P. Dirouchoux (Centre d'Etudes Nucleaires de Saclay), and J. M. Hameury (Centre d'Etudes Nucleaires de Saclay) *In its* NASA/Goddard Space Flight Center Contrib. to the Workshop on Positron-Electron Pairs in Astrophys. Mar. 1983 p 39-44 refs (For primary document see N83-27928 16-88)
Avail: NTIS HC A04/MF A01 CSCL 03A

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N83-27945 Academy of Sciences (USSR), Moscow. Space Research Inst.
GAMMA-GUN IN THE CENTER OF THE GALAXY
N. S. Kardashev, I. D. Novikov, A. G. Polnarev, and B. E. Stern 1982 35 p refs
(Rept-757) Copyright. Avail: Issuing Activity

The annihilation line and the continuous spectrum over the range of energies more than 100 KeV may result from the interaction of a directed gamma-quanta beam (with a characteristic energy of approx. 100 MeV), formed near a massive black hole (some kind of a 'gamma gun'), and the gaseous matter of the cloud/target. The results of similar calculations of such interaction are given. Author

N83-27946*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ENERGETIC-ION ACCELERATION AND TRANSPORT IN THE UPSTREAM REGION OF JUPITER: VOYAGER 1 AND 2
D. N. Baker (LASL), R. D. Zwickl (LASL), J. F. Carbary (APL, Laurel, Md.), S. M. Krimigis (APL, Laurel, Md.), and R. P. Lepping 1982 5 p refs Presented at the Symp. on Giant Planets and Their Satellites, Ottawa, 17-27 May 1982
(Contract W-7405-eng-36)
(NASA-TM-85179; NAS 1.15:85179; DE82-019574;
LA-UR-82-19142; CONF-82058-3) Avail: NTIS HC A02/MF A01

Long-lived upstream energetic ion events at Jupiter appear to be very similar in nearly all respects to upstream ion events at Earth. A notable difference between the two planetary systems is the enhanced heavy ion compositional signature reported for the Jovian events. This compositional feature has suggested that ions escaping from the Jovian magnetosphere play an important role in forming upstream ion populations at Jupiter. In contrast, models of energetic upstream ions at Earth emphasize in situ acceleration of reflected solar wind ions within the upstream region itself. Using Voyager 1 and 2 energetic (> approximately 30 keV) ion measurements near the magnetopause, in the magnetosheath, and immediately upstream of the bow shock, the compositional patterns are examined together with typical energy spectra in each of these regions. A model involving upstream Fermi acceleration early in events and emphasizing energetic particle escape in the prenoon part of the Jovian magnetosphere late in events is presented to explain many of the features in the upstream region of Jupiter. DOE

N83-27929*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
AN ELECTRON-POSITRON JET MODEL FOR THE GALACTIC CENTER
M. L. Burns (Maryland Univ.) *In its* NASA/Goddard Space Flight Center Contrib. to the Workshop on Positron-Electron Pairs in Astrophys. Mar. 1983 p 1-6 refs (For primary document see N83-27928 16-88)
Avail: NTIS HC A04/MF A01 CSCL 03B

N83-27930*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
COMPARISON OF PHOTON-PHOTON AND PHOTON-MAGNETIC FIELD PAIR PRODUCTION RATES
M. L. Burns (Maryland Univ.) and A. K. Harding *In its* NASA/Goddard Space Flight Center Contrib. to the Workshop on Positron-Electron Pairs in Astrophys. Mar. 1983 p 7-12 refs (For primary document see N83-27928 16-88)
Avail: NTIS HC A04/MF A01 CSCL 03B

N83-27931*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PAIR PRODUCTION AND ANNIHILATION IN STRONG MAGNETIC FIELDS
J. K. Daugherty (North Carolina Univ.) and A. K. Harding *In its* NASA/Goddard Space Flight Center Contrib. to the Workshop on Positron-Electron Pairs in Astrophys. Mar. 1983 p 13-26 refs (For primary document see N83-27928 16-88)
Avail: NTIS HC A04/MF A01 CSCL 03B

N83-27934*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PAIR PRODUCTION NEAR THRESHOLD IN PULSAR MAGNETIC

FIELDS
A. K. Harding and J. K. Daugherty (North Carolina Univ.) *In its* NASA/Goddard Space Flight Center Contrib. to the Workshop on Positron-Electron Pairs in Astrophys. Mar. 1983 p 45-49 refs (For primary document see N83-27928 16-88)
Avail: NTIS HC A04/MF A01 CSCL 03B

N83-27936*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE ORIGIN OF THE GALACTIC ANNIHILATION RADIATION
R. E. Lingenfelter (California Univ.) and R. Ramaty *In its* NASA/Goddard Space Flight Center Contrib. to the Workshop on Positron-Electron Pairs in Astrophys. Mar. 1983 p 57-62 refs (For primary document see N83-27928 16-88)
(Grant NsG-7541)
Avail: NTIS HC A04/MF A01 CSCL 03B

N83-27937*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
CRITERIA FOR GRASAR ACTION IN ASTROPHYSICAL SOURCES
J. M. McKinley (Maryland Univ.) and R. Ramaty *In its* NASA/Goddard Space Flight Center Contrib. to the Workshop on Positron-Electron Pairs in Astrophys. Mar. 1983 p 63-67 refs (For primary document see N83-27928 16-88)
Avail: NTIS HC A04/MF A01 CSCL 03B

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights.

For spacecraft design see *18 Spacecraft Design Testing, and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

N83-27947*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
SMECTITES VERSUS PALAGONITES IN MARS SOIL: EVIDENCE FROM SIMULATIONS OF VIKING BIOLOGY LABELED RELEASE EXPERIMENTS
A. Banin and L. Margulies (Hebrew Univ., Rehovot, Israel) May 1983 18 p refs
(NASA-TM-84361; A-9320; NAS 1.15:84361) Avail: NTIS HC A02/MF A01 CSCL 03B

The results of an experimental comparison between palagonites and a smectite (montmorillonite) in the simulation of the Viking Biology Labeled Release (LR) experiment and conclusions regarding their suitability as MarSAMs are reproved. It was found that palagonites do not cause formate decomposition and C-14 release in their natural form or after acidification and thus cannot be a completely satisfactory analog to the Mars soil studied by Viking. Author

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N83-27948# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
PERSISTENT 1.5S OSCILLATIONS SUPERIMPOSED AT A SOLAR BURST OBSERVED AT TWO mm-WAVELENGTHS
A. M. Zodi, P. Kaufmann, and H. Zirin (California Inst. of Tech., Pasadena) May 1983 31 p refs Submitted for publication Sponsored by FINEP
(INPE-2737-PRE/317) Avail: NTIS HC A03/MF A01

Long-enduring quasi-periodic oscillations (1.5s) superimposed to a solar burst were observed simultaneously at two different mm-wavelengths (22 GHz and 44 GHz). The oscillations were present throughout the burst duration (about 10 min), and were delayed at 44 GHz with respect to 22 GHz by 0.3s. The relatives amplitude of the oscillation was of about 20 percent at 44 GHz and of about 5 percent at 22 GHz. Interferometer measurements at 10.6 GHz indicated the burst source stable within 1 arcsec. HeD3 line flare indicated two persistent small spots separated by about 10 arcsec. The 22/44 GHz burst position has good correspondence with the HeD3 spots' location. The oscillations displays features which apprear to distinguish them from ultrafast time structures found in other bursts. One possible interpretation was suggested by assuming a modulation of the gyrosynchrotron emission of trapped electrons by a variable magnetic field on a double burst source, optically thin at 44 GHz and with optical thickness > or approximately 0.3 at 22 GHz. Author

N83-27949# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
CORRELATING RADIO EMISSIONS WITH VISIBLE EMISSIONS FROM INDIVIDUAL SOLAR ACTIVE REGIONS M.S. Thesis
Dec. 1982 79 p refs
(AD-A124892; AFIT/GSO/MA/82D-2) Avail: NTIS HC A05/MF A01 CSCL 12/1

Using a statistical regression model, a relationship was found between the area of solar active regions (bright in hydrogen-alpha. Lambda = 6562.8 A in the visible) and their 10.7 cm radio emission. Data used in this analysis were the brightness-area histograms obtained from the Solar Observing Optical Network (SOON) and daily drift scans obtained from the Algonguin Radio Observatory, Ottawa, Canada. This data, for the period 1 May through 16 July 1978, was used to develop the following relationship: Algonguin Scan Peak Value = .88782838 + .00025237604 (Calibrated SOON Area) with a correlation coefficient, r, of .88509. Future models for perdicting the 10.7 cm solar flux are theorized based on the established relationship. GRA

93 SPACE RADIATION

Includes cosmic radiation; and inner and outer Earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

N83-27932*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
LOW-TEMPERATURE POSITRON ANNIHILATION
Richard J. Drachman *In its* NASA/Goddard Space Flight Center Contrib. to the Workshop on Positron-Electron Pairs in Astrophys. Mar. 1983 p 27-38 refs (For primary document see N83-27928 16-88)
Avail: NTIS HC A04/MF A01 CSCL 03B

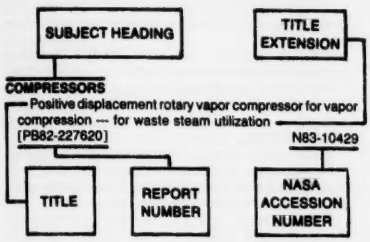
N83-27935*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ELECTRON-POSITRON ANNIHILATION AND THE COSMIC X-RAY BACKGROUND
Demosthenes Kazanas (Maryland Univ.) and Richard Arrick Shafer (Maryland Univ.) *In its* NASA/Goddard Space Flight Center Contrib. to the Workshop on Positron-Electron Pairs in Astrophys. Mar. 1983 p 51-55 refs (For primary document see N83-27928 16-88)
Avail: NTIS HC A04/MF A01 CSCL 03B

99 GENERAL

No abstracts in this category.

SUBJECT INDEX

Typical Subject Index Listing



The subject heading is the key to the subject content of the document. Titles, report numbers, and accession numbers of pertinent documents are provided under each subject heading. When the title is insufficiently descriptive of the document content, a title extension has been added, separated from the title by three hyphens. The report number helps to indicate the type of document cited (e.g., NASA report, NASA translation, NASA contractor report). The NASA accession number is the number by which the document abstracts are arranged in this journal and by which the document is sold or requested. The titles, with title extensions if present, are arranged under each subject heading in ascending accession number order. The subject headings have been selected from the latest revision of the *NASA Thesaurus* (NASA SP-7051).

A

ABILITIES
S-C-R compatibility and dual task performance in two complex information processing tasks: Threat evaluation and fault diagnosis
[AD-A124340] N83-27589
Knowledge and skill differences in novices and experts
[AD-A124466] N83-27592
Validation of brain event-related potentials as indicators of cognitive styles, abilities, and aptitudes
[AD-A125292] N83-27593

ABIOGENESIS
Deep-source-gas workshop technical proceedings
[DE83-005003] N83-27339

ABSORBENTS
Organic solvent regeneration of granular activated carbon
[PB83-150201] N83-27078
Efficiency of buffered aqueous carboxylic acid solutions and organic solvents to absorb SO2 from industrial flue; solubility data from gas-liquid chromatography
[DE83-005405] N83-27510

ABSORPTION CROSS SECTIONS
Stopping power of rare gases in amorphous silicon for MeV helium ions N83-27707

ABSORPTIVITY
Investigations of the 1 KHz sound absorption in sea water
[AD-A124888] N83-27797

AC GENERATORS
The development of a reduced-order functional representation of an alternator-rectifier excitation system aut 01Chen-Chen
[DE83-006437] N83-27133
Development of variable-shaft-speed alternator
[DE82-012334] N83-27139

ACCELERATION (PHYSICS)
A method for testing components in the high acceleration frequency range
[TULEA-1981-18] N83-27269
Comparative analysis of positive and negative lateral acceleration on isometric fatigue
[AD-A124752] N83-27587

ACCELERATION STRESSES (PHYSIOLOGY)
Response of the cardiovascular system to vibration and combined stresses
[AD-A125225] N83-27583

ACCELERATION TOLERANCE
Comparative analysis of positive and negative lateral acceleration on isometric fatigue
[AD-A124752] N83-27587

ACCELEROMETERS
Statistical review of counting accelerometer data for Navy and Marine fleet aircraft
[AD-A124966] N83-26834

ACCEPTABILITY
Acceptance control charts based on the exact and normal approximations to the binomial distributions
[AD-A124964] N83-27686

ACCIDENT PREVENTION
Operational readiness and the human factors environment
[DE83-005586] N83-27602

ACCIDENTS
Operational readiness and the human factors environment
[DE83-005586] N83-27602

ACCURACY
Computation of incompressible potential flow over an airfoil using a high order aerodynamic panel method based on circular arc panels
[AD-A124896] N83-26825
Numerical computation of the matrix Riccati equation for heat propagation during space shuttle reentry
[AD-A124873] N83-26916
Geometric accuracy of LANDSAT-4 MSS image data
[E83-10347] N83-27322

ACID RAIN
Meteorological Effects of Thermal Energy Releases (METER) program
[DE83-008313] N83-27502
Processes of atmospheric deposition of metals and acids to forests
[DE82-017442] N83-27504
Acid rain: Control strategies for coal-fired utility boilers, volume 1
[DE83-006695] N83-27511
ARIS: Acid Rain Information System
[DE83-007026] N83-27512

ACOUSTIC ATTENUATION
Investigations of the 1 KHz sound absorption in sea water
[AD-A124888] N83-27797

ACOUSTIC EMISSION
Nondestructive inspection and evaluation of composite-material flywheels
[DE82-015379] N83-26930
Acoustic emissions during deformation of intact and jointed welded tuff
[DE82-018346] N83-27805

ACOUSTIC MEASUREMENT
Speech intelligibility in closed large scale environments
[FUB-24-1982] N83-27123
Computerized measurement and tracking of acoustical resonances
[AD-A125286] N83-27799
Equipment for recording the direction of incidence of infrasonic sound waves. Technical description
[FOA-C-30307-E1] N83-27807

ACOUSTIC PROPAGATION
Some simple formulae for normal mode wave numbers, cutoff frequencies and the number of modes trapped by a sound channel
[AD-A124948] N83-27798
Sensitivity to sound speed of surface/bottom reflecting transmissions in a deep ocean channel
[AD-A125278] N83-27800

ACOUSTIC VELOCITY
Sensitivity to sound speed of surface/bottom reflecting transmissions in a deep ocean channel
[AD-A125278] N83-27800
Elastic constants of plastic crystals by Schaefer-Bergmann scattering: Crystalline cyclohexane and deuteromethane
[DE82-018660] N83-27885

ACOUSTICS
Use of analytical mechanics in defining acoustic-test methodology
[DE82-018615] N83-27802

ACTIVATED CARBON
Organic solvent regeneration of granular activated carbon
[PB83-150201] N83-27078

ACTIVATION ANALYSIS
Instrumental photon activation analysis using the linear accelerator at the Naval Postgraduate School
[AD-A125003] N83-27811

ACTIVATION ENERGY
Applications of resonance-averaged gamma-ray spectroscopy with tailored beams
[DE82-018098] N83-26955
Thermal Desorption Spectroscopy (TDS) of hydrogen from niobium
[DE82-012024] N83-26981

ACTIVE CONTROL
Application of modern control theory for building structures
[PB83-144147] N83-27080
Reliability aspects of structural control
[PB83-145482] N83-27082

ACTUATION
First flight test of Chinese electron rocket is successful N83-26926

ADAPTIVE CONTROL
Multiple model adaptive estimation for space-time point process observations
[AD-A124827] N83-27641

ADAPTIVE FILTERS
The performance of a PN spread spectrum receiver preceded by an adaptive interference suppression filter
[AD-A124903] N83-27098
Performance surfaces of adaptive predictors structures
[DE82-020090] N83-27663

ADDING CIRCUITS
Statistical properties of the sequences produced by additive scramblers — data transmission
[FUB-23-1982] N83-27122

ADDITIVES
Electrochemical studies at carbon black paste electrodes containing cupric chloride additive
[AD-A125276] N83-26942
Radiolabelling of chemicals
[DE82-017576] N83-26949
An investigation of the effectiveness of smoke suppressant fuel additives for turbojet applications
[AD-A125025] N83-27034

ADENOSINE TRIPHOSPHATE
Rapid, quantitative determination of bacteria in water — adenosine triphosphate
[NASA-CASE-GSC-12158-1] N83-27569

ADHESION
Role of amines in adhesion of polybutadiene to glass substrates. 4: The effect of amine structure and concentration on the strength of adhesion
[AD-A121686] N83-27028

ADIABATIC CONDITIONS
Compound-compressible nozzle flow N83-26790
Liquid-phase methanation/shift process development
[DE82-015214] N83-26961
Modeling the turbulence structure of the adiabatic atmospheric boundary layer
[TULEA-1982-12] N83-27532

ADRENAL METABOLISM
Function of adreno-pituitary system in various regimes of effect of alternating magnetic field of industrial frequency N83-27576

ADSORBENTS
Sulfur control in fluidized-bed combustors: Methodology for predicting the performance of limestone and dolomite sorbents
[DE83-007658] N83-27500
Sulfur control in fluidized-bed combustors: Methodology for predicting the performance of limestone and dolomite sorbents. Addendum. Compilation of sorbent performance data from atmospheric fluidized-bed combustors
[DE83-007659] N83-27501
AERIAL PHOTOGRAPHY
Information theoretic detection of objects embedded in cluttered aerial scenes
[AD-A124975] N83-27187
AERIAL RECONNAISSANCE
Statistical Techniques Applied to Aerial Radiometric Surveys (STAARS): Application of the Huber M-estimator to aerial radiometric data for the identification of host and source areas for uranium deposits
[DE82-018199] N83-27335
AEROACOUSTICS
Equipment for recording the direction of incidence of infrasonic sound waves. Technical description
[FOA-C-30307-E1] N83-27807
AERODYNAMIC CHARACTERISTICS
Aircraft aerodynamic prediction method for V/STOL transition including flow separation
[NASA-CR-166467] N83-26818
Integrated aerodynamic tests of the space shuttle vehicle during solid rocket booster separation at Mach 4.5 (IA193)
[AD-A125297] N83-26915
AERODYNAMIC CONFIGURATIONS
Selected advanced aerodynamics and active controls technology concepts development on a derivative B-747 aircraft
[NASA-CR-3295] N83-26831
Aerodynamic characteristics of generalized bent biconic bodies for aero-assisted, orbital-transfer vehicles
[NASA-TM-84362] N83-26918
AERODYNAMIC DRAG
Constant parameter two component channel flows N83-26797
AERODYNAMIC HEATING
Body flap heat transfer data from space shuttle orbiter entry flight test maneuvers
[AD-A124844] N83-26914
AERODYNAMIC INTERFERENCE
Experimental study of main rotor/tail rotor/airframe interactions in hover. Volume 1: Text and figures
[NASA-CR-166485] N83-26820
AERODYNAMIC LOADS
Aerodynamic research on Tipvane windturbines
[PB83-147413] N83-27476
AERODYNAMIC NOISE
Low flight speed acoustic results for a supersonic inlet with auxiliary inlet doors
[NASA-TM-83411] N83-27794
AERODYNAMIC STALLING
The use of vortex generators as inexpensive compressor casing treatment N83-26798
Experimental studies of the separating confluent boundary-layer. Volume 1: Summary
[NASA-CR-3655] N83-26822
Aircraft accident report: IBEX Corporation Gates Learjet 23, N100TA, Atlanta, near Savannah, Georgia, 6 May 1982
[PB83-910401] N83-26827
Pilot human factors in stall/spin accidents of supersonic fighter aircraft
[NASA-TM-84348] N83-26846
AERODYNAMICS
Aeronautical Engineering: A continuing bibliography, 1982 cumulative index
[NASA-SP-7037(157)] N83-26784
A note on the oscillation of cavities coupled to aerodynamic flows N83-26795
Feasibility study of three-dimensional holographic interferometry for aerodynamics
[NASA-CR-166483] N83-27845
AERONAUTICAL ENGINEERING
Aeronautical Engineering: A continuing bibliography, 1982 cumulative index
[NASA-SP-7037(157)] N83-26784
Some historical trends in the research and development of aircraft
[NASA-TM-84665] N83-26785
A visit to the Computer Science Department
[AD-A124855] N83-27607
AEROSOLS
Particle analyzing method and apparatus
[NASA-CASE-NPO-15292-1] N83-27184
Atmospheric effects on METSAT data
[E83-10314] N83-27303
SAM 2 measurements of the polar stratospheric aerosol. Volume 3: October 1979 to April 1980
[NASA-RP-1106] N83-27520
Atmospheric conditions influencing slant path low visibility
[AD-A116109] N83-27847
AEROSPACE ENGINEERING
AGARD Bulletin: Meetings, publications, membership
[AGARD-BUL-83/1] N83-26786
AEROSPACE ENVIRONMENTS
First flight test of Chinese electron rocket is successful N83-26926
AEROSPACE MEDICINE
Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 246)
[NASA-SP-7011(246)] N83-27579
AEROTHERMODYNAMICS
Numerical computation of the matrix Riccati equation for heat propagation during space shuttle reentry
[AD-A124873] N83-26916
AFTERBODIES
Wind tunnel investigation of separated flow over an afterbody in supersonic axisymmetric stream utilizing one-component laser-Doppler-velocimetry
[FFA-TN-1983-10] N83-26826
AGGREGATES
Changes in the states of aggregation on the electrodes during condensed discharges
[AD-A124780] N83-27128
AGING (MATERIALS)
The 48 hour multiaxial creep and recovery of 2618 aluminum alloy at 200C
[AD-A124993] N83-26998
AGING (METALLURGY)
Aging response of a welded iron-based superalloy
[DE83-005856] N83-27005
Effects of ageing on the ductile-fracture mechanism in a high-strength low-alloy steel (300M)
[AERE-R-10783] N83-27015
High temperature properties of the seam weld portion in 1% Cr-0.5% Mo ERW boiler tubing after long-term aging N83-27223
AGRICULTURE
Biomass-energy-technology program summary
[DE82-018926] N83-27426
Energy future Santa Cruz. A citizens plan for energy self-reliance: Executive summary
[PB83-136978] N83-27474
AGRISTARS PROJECT
Parallel processing implementations of a contextual classifier for multispectral remote sensing data
[E83-10273] N83-27285
Establishment of a center of excellence for applied mathematical and statistical research
[E83-10307] N83-27297
Atmospheric effects on METSAT data
[E83-10314] N83-27303
Assessing solar energy and water use efficiencies in winter wheat
[E83-10329] N83-27313
Research and development of LANDSAT-based crop inventory techniques
[E83-10359] N83-27325
AIR
Comparison of the initial ETA gas-propagation experiments with theoretical models
[DE82-015415] N83-27843
AIR FLOW
Injection, atomization, ignition and combustion of liquid fuels in high-speed air streams
[AD-A125237] N83-27033
Kahuku kite wind study. 1: Kahuku beach boundary layer
[DE83-006403] N83-27553
AIR INTAKES
Experimental study of strength and existance domain of ground-to-air inlet vortices by ground board static pressure measurements
[PB83-144865] N83-26843
Low flight speed acoustic results for a supersonic inlet with auxiliary inlet doors
[NASA-TM-83411] N83-27794
AIR MASSES
Numerical simulation of the influence of small scale mountain ranges on a baroclinic wave
[AD-A125301] N83-2754
AIR POLLUTION
An investigation of the effectiveness of smoke suppressant fuel additives for turbojet applications
[AD-A125025] N83-27034
High-temperature turbine-technology program. Phase 2: Technology test and support studies. Design and development of a regeneratively fuel cooled high temperature gas turbine combustor for operation on low Btu gas
[DE83-007342] N83-27241
DIF1: A dispersion program which can handle pollution and reflection
[ATMOS/82/11] N83-27478
Pacific Northwest Laboratory report to the DOE Office of Energy Research. Part 3: Atmospheric sciences
[DE83-007472] N83-27488
Transformation of energy-related pollutants N83-27489
Atmospheric diffusion in complex terrain N83-27490
Atmospheric boundary layer studies N83-27491
Atmospheric diffusion in complex terrain N83-27492
Air pollution dry deposition: Radioisotopes as particles and volatiles N83-27494
Oil shale fugitive air emissions N83-27495
Theoretical studies and application N83-27497
Sulfur control in fluidized-bed combustors: Methodology for predicting the performance of limestone and dolomite sorbents
[DE83-007658] N83-27500
Sulfur control in fluidized-bed combustors: Methodology for predicting the performance of limestone and dolomite sorbents. Addendum. Compilation of sorbent performance data from atmospheric fluidized-bed combustors
[DE83-007659] N83-27501
New pollutant dispersion model for application in mountain valleys
[DE83-005289] N83-27509
Acid rain: Control strategies for coal-fired utility boilers, volume 1
[DE83-006695] N83-27511
Quality assurance for environmental analytical chemistry: 1981
[DE83-007102] N83-27513
AIR QUALITY
Organic Air Pollutants: Setting Priorities for Long Term Research Needs
[DE83-005997] N83-27507
Implications of emerging environmental-control technologies for air-pollution regulations
[DE83-005901] N83-27508
AIR TO AIR REFUELING
Dynamic characteristics of aerial refueling systems
[AD-A124770] N83-26830
Lateral flying qualities of highly augmented fighter aircraft, volume 1
[AD-A118070] N83-26835
AIR TRAFFIC CONTROL
Numerical treatment of Doppler radar signals --- airport radar, video data
[ENST-E-82014] N83-27114
AIRBORNE EQUIPMENT
Laser safety of air bathymetry
[FOA-C-30292-E1] N83-27210
AIRBORNE/SPACEBORNE COMPUTERS
LANDSAT-D flight segment operations manual, volume 1
[E83-10285] N83-27287
LANDSAT-D flight segment operations manual. Appendix B: OBC software operations
[E83-10288] N83-27290
AIRCRAFT ACCIDENTS
Aircraft accident report: IBEX Corporation Gates Learjet 23, N100TA, Atlanta, near Savannah, Georgia, 6 May 1982
[PB83-910401] N83-26827
AIRCRAFT CONFIGURATIONS
Experimental studies of the separating confluent boundary-layer. Volume 1: Summary
[NASA-CR-3655] N83-26822
Selected advanced aerodynamics and active controls technology concepts development on a derivative B-747 aircraft
[NASA-CR-3295] N83-26831
AIRCRAFT CONTROL
Selected advanced aerodynamics and active controls technology concepts development on a derivative B-747 aircraft
[NASA-CR-3295] N83-26831
Lateral flying qualities of highly augmented fighter aircraft, volume 1
[AD-A118070] N83-26835
Determination of stability and control parameters of a general aviation airplane from flight data
[NASA-TM-84635] N83-26844
AIRCRAFT DESIGN
Some historical trends in the research and development of aircraft
[NASA-TM-84665] N83-26785
Statistical experimental designs in computer aided optimal aircraft design N83-26812
Status, trends and implications of carbon fiber material use
[PB83-147751] N83-26934

AIRCRAFT ENGINES
Dynamic distortion in a short s-shaped subsonic diffuser with flow separation --- Lewis 8 by 6 foot Supersonic Wind Tunnel
[NASA-TM-84312] N83-26838
Method of studying the operating temperature of gas turbines --- aeroengines
[PNR-90159] N83-26842

AIRCRAFT FUEL SYSTEMS
Dynamic characteristics of aerial refueling systems
[AD-A124770] N83-26830

AIRCRAFT HAZARDS
Aircraft lightning-induced voltage test technique developments
[NASA-CR-170403] N83-26829
RF radiation from lightning correlated with aircraft measurements during storm hazards-82
[NASA-TM-85007] N83-27537

AIRCRAFT LANDING
Lateral flying qualities of highly augmented fighter aircraft, volume 1
[AD-A118070] N83-26835
A flight-test and simulation evaluation of the longitudinal final approach and landing performance of an automatic system for a light wing loading STOL aircraft
[NASA-TM-84270] N83-26845

AIRCRAFT PERFORMANCE
Experimental analysis of the performance of an annular peripheral jet vehicle in ground effect
[AD-A124949] N83-26832

AIRCRAFT SPIN
Pilot human factors in stall/spin accidents of supersonic fighter aircraft
[NASA-TM-84348] N83-26846

AIRCRAFT STABILITY
Determination of stability and control parameters of a general aviation airplane from flight data
[NASA-TM-84635] N83-26844

AIRCRAFT SURVIVABILITY
Survivability of interdiction aircraft: Sensitivity to terrain following, command altitude, velocity and electronic counter measures
[AD-A124870] N83-26833

AIRFOILS
The use of vortex generators as inexpensive compressor casing treatment N83-26798
Experimental studies of the separating confluent boundary-layer. Volume 1: Summary
[NASA-CR-3655] N83-26822
Computation of incompressible potential flow over an airfoil using a high order aerodynamic panel method based on circular arc panels
[AD-A124896] N83-26825
Calculation of boundary layers near the stagnation point of an oscillating airfoil
[NASA-TM-84305] N83-27148
Implicit upwind methods for the compressible Navier-Stokes equations
[NASA-TM-84364] N83-27149
Heating measurements on Space Shuttle Orbiter models with differentially deflected elevons
[NASA-TM-84646] N83-27151

AIRPORTS
Terminal forecast reference notebook for Grafenwoehr AAF, Germany
[AD-A125038] N83-27549
Terminal forecast reference notebook for Heidelberg AB, Germany
[AD-A125037] N83-27550
AICUZ (Air Installation Compatible Use Zone) report
[AD-A124974] N83-27801

ALCOHOLS
A study of solvent and aqueous cleaning of fluxes
[AD-A124950] N83-26994
Development of a biochemical process for production of alcohol fuel from peat
[DE82-016692] N83-27039
TVA/DOE integrated onfarm alcohol production system, phase 2
[DE82-016973] N83-27049
Overview of fuel alcohol from agricultural crops with emphasis on the Tennessee Valley
[DE82-016932] N83-27050

ALFALFA
Radionuclide fate and effects N83-27486

ALGAE
Biosolar hydrogen and oxygen production
[DE82-017491] N83-27428
Photosynthetic water splitting
[DE82-017315] N83-27429

ALGEBRA
A finite-particle-number approach to physics
[DE83-007014] N83-27791

ALGERIA
Libya, Algeria and Egypt: Crude oil potential from known deposits
[DE82-018578] N83-27334

ALGORITHMS
Systems design and comparative analysis of large antenna concepts N83-26863
Numerical computation of the matrix Riccati equation for heat propagation during space shuttle reentry
[AD-A124873] N83-26916
Assessment of the quality of bearing steel from its inclusion content
[BLL-M-26906-(5828.4)] N83-26991
Performance of sequentially decoded long constraint length codes for a satellite communications link in a scintillated channel
[AD-A124814] N83-27093
Numerical treatment of Doppler radar signals --- airport radar, video data
[ENST-E-82014] N83-27114
Handbook of thermal insulation applications
[AD-A125264] N83-27158
Parallel processing implementations of a contextual classifier for multispectral remote sensing data
[E83-10273] N83-27285
Interface unit for relative humidity measurement with dew point meter
[FOA-C-30309-E] N83-27556
Analysis of ANSI N13.11: The performance algorithm
[DE82-019212] N83-27628
Problem solving techniques for the design of algorithms
[AD-A125211] N83-27643
Anomalies in parallel branch-and-bound algorithms
[AD-A125290] N83-27648
Local structure of feasible sets in nonlinear programming. Part 1: Regularity
[AD-A125244] N83-27657
Conditional permutation tests and the propensity score in observational studies
[AD-A125241] N83-27658
Performance surfaces of adaptive predictors structures
[DE82-020090] N83-27663
Degenerate perturbation theory
[DE82-019555] N83-27665
Recent developments in algorithms and software for trust-region methods
[DE83-006276] N83-27667
Unsteady models, vectorial autoregressive models, and Levinson's algorithm
[ENST-D-82005] N83-27676
Development of procedures and algorithms for pattern recognition and image processing based on two-dimensional Markov models
[AD-A124917] N83-27682
Automatic test generation using a matrix model of digital systems
[DE82-009988] N83-27693
Eigenvalue problem for Hermitian matrices with time-reversal symmetry
[DE83-005629] N83-27695
Automatic beam-steering of the Mainz Microtron N83-27775
Sandia Helicopter Acoustic Detector (SHAD)
[DE82-018925] N83-27803
Determining velocities by propagation
[AD-A124889] N83-27849

ALIGNMENT
Analysis of streak-camera measurement errors caused by misorientation of the camera slit with recording direction
[DE83-005970] N83-27197
The design of double sided microtrons N83-27778

ALKALINE EARTH METALS
Coal-gasification catalysis mechanisms
[DE82-013824] N83-26960

ALKENES
Development of improved plastic piping materials and systems for fuel gas distribution
[PB83-161109] N83-27079

ALLOYS
Dynamic powder compaction of rapidly solidified Path A alloy with increased carbon and titanium content
[DE82-017252] N83-27008
Laser welding of structural alloys N83-27228
Brazing techniques and alloys for accelerator RF components N83-27742
Beam broadening in a strongly scattering target in the analytical electron microscope
[DE82-014085] N83-27825

ALUMINATES
Modular incoherent CO sub 2 TEA lasers
[AD-A124960] N83-27204

ALUMINUM
Multiaxial creep of 2618 aluminum under proportional loading steps
[AD-A125023] N83-26997
Continuous cable processing by the physical vapor deposition technique
[DE83-006011] N83-27003

ALUMINUM ALLOYS
Multiaxial creep of 2618 aluminum under proportional loading steps
[AD-A125023] N83-26997
The 48 hour multiaxial creep and recovery of 2618 aluminum alloy at 200C
[AD-A124993] N83-26998

ALUMINUM NITRIDES
Aluminum nitride thin film and composite bulk wave resonators
[DE82-019303] N83-27135

ALUMINUM OXIDES
Interaction of hydrogen molecular ions with thin foils. Part 3: Inner-shell ionization N83-27723

AMAZON REGION (SOUTH AMERICA)
Evaluation of ground cover and land use in the PDRI-AM remote sensing technique program area --- Brazil
[E83-10230] N83-27283

AMBIENT TEMPERATURE
Intermediate photovoltaic system application experiment operational performance report for G. N. Wilcox Hospital, Kauai, Hawaii for September 1982, volume 5
[DE83-008843] N83-27454
Intermediate photovoltaic system application experimental operational performance report for Newman Power Station, El Paso, Texas for September 1982, volume 15
[DE83-006845] N83-27459
Intermediate photovoltaic system application experiment operational performance report for Beverly High School, Beverly, Massachusetts for August 1982, volume 12
[DE83-007092] N83-27460

AMERICIUM
Radionuclide fate and effects N83-27486

AMERICIUM ISOTOPES
Laser-optical studies of the spontaneous-fission isomer /sup 240m/Am
[DE82-017433] N83-27817

AMINES
Role of amines in adhesion of polybutadiene to glass substrates. 1: Reactions of amines during peroxide curing of polybutadiene
[AD-A121685] N83-27027
Role of amines in adhesion of polybutadiene to glass substrates. 4: The effect of amine structure and concentration on the strength of adhesion
[AD-A121686] N83-27028

AMMONIA
H2S removal from coal gas at mid temperature (150 to 200 deg C)
[DE82-011004] N83-26963
Hydrogen derived from ammonia: Small-scale costs
[DE82-012720] N83-27040
Ammonia-air fuel cell power plant systems analysis
[DE82-018914:] N83-27464

AMPLIFICATION
High-gain error actuated flight control systems for continuous linear multivariable plants
[AD-A124871] N83-26848

AMPLIFIERS
Traveling-wave tube amplifier characteristics study for stochastic beam-cooling experiments
[DE83-005867] N83-27132

AMPLITUDE MODULATION
A beam cavity interaction computer code for linacs N83-27735

AMPLITUDES
Computerized measurement and tracking of acoustical resonances
[AD-A125286] N83-27799

ANAEROBES
Development of a biochemical process for production of alcohol fuel from peat
[DE82-016692] N83-27039

ANALOG TO DIGITAL CONVERTERS
The distributed control system for the Fermilab 200 MeV Linac N83-27782
Automatic threshold design for a bound document scanner
[AD-A125316] N83-27913

ANALYSIS (MATHEMATICS)
Stability of laminated composite shells subjected to uniform axial compression and torsion
[AD-A125204] N83-27262
Summaries of the FY 1982 Applied Mathematical Sciences Research Program
[DE83-005815] N83-27668

ANALYTICAL CHEMISTRY
Quality assurance for environmental analytical chemistry: 1981
[DE83-007102] N83-27513
Beam broadening in a strongly scattering target in the analytical electron micropecope
[DE82-014085] N83-27825
ANEMOMETERS
A new look at turbulence experienced by a rotating wind turbine
[DE83-007044] N83-27383
Kahuku kite wind study. 1: Kahuku beach boundary layer
[DE83-006403] N83-27553
Kahuku kite wind study. 2: Kahuku foothills
[DE83-006402] N83-27554
ANGLE OF ATTACK
Boundary-layer transition on blunt, slender cones at hypersonic Mach numbers N83-26794
Heat-transfer distributions on biconics at incidence in hypersonic-hypervelocity He, N2, air, and CO2 flows
[NASA-TM-84667] N83-27150
ANGULAR DISTRIBUTION
Molecular beam studies of primary photochemical processes
[DE83-006190] N83-26946
Note on the elastic-scattering of few-MeV neutrons from elemental calcium
[DE82-019476] N83-27827
Fast-neutron scattering cross sections of elemental silver
[DE82-019477] N83-27883
ANGULAR MOMENTUM
General mechanism analysis package
[DE82-006158] N83-27060
The role of rotational degrees of freedom in heavy-ion collisions
[DE82-015751] N83-27820
ANGULAR RESOLUTION
Geometrical effect on stopping power measurement (angle dependent energy loss) of 7 MeV protons N83-27699
ANGULAR VELOCITY
Computation of incompressible potential flow over an airfoil using a high order aerodynamic panel method based on circular arc panels
[AD-A124896] N83-26825
Experimental investigation of the mixing of highly swirling flows
[AD-A125249] N83-27160
Motion estimation based on multiple local constraints and nonlinear smoothing
[AD-A124838] N83-27640
ANISOTROPIC MEDIA
Ray tracing in dissipative media
[KGI-PREPRINT-060] N83-27112
ANISOTROPIC SHELLS
Bending of laminated anisotropic shells by a shear deformable finite element
[PB83-145409] N83-27278
ANISOTROPY
Behavior of a rigid inclusion stressmeter in an anisotropic field
[DE82-016063] N83-27188
ANNEALING
A study of the effect of interrupted quenches on a thermomechanically processed high carbon steel
[AD-A124985] N83-26996
Melt depth and regrowth kinetics in pulsed laser annealing of silicon and gallium arsenide
[DE83-005192] N83-27205
Some observations on the physical metallurgy of nickel alloy weld metals N83-27240
Low-cost, sprayed CdTe solar-cell research
[DE83-007275] N83-27392
ANNUAL VARIATIONS
Terminal forecast reference notebook for Heidelberg AB, Germany
[AD-A125037] N83-27550
Tidal and lunar data for Point Mugu, San Nicolas Island, and the Barking Sands area during 1983
[AD-A124810] N83-27565
ANNULAR NOZZLES
Model aerodynamic test results for a refined actuated inlet ejector nozzle at simulated takeoff and cruise conditions
[NASA-CR-168051] N83-26816
ANODES
Anode phenomena in vacuum arcs
[DE83-007181] N83-27141
Improvements in Li(Si)/FeS2 thermal battery technology
[DE82-017779] N83-27463
ANOMALIES
Anomalies in parallel branch-and-bound algorithms
[AD-A125290] N83-27648
ANTARCTIC REGIONS
The brine zone in the McMurdo Ice Shelf, Antarctica
[AD-A124516] N83-27558
ANTENNA ARRAYS
Antenna technology for orbital Very Long Baseline Interferometry (VLBI) N83-26859
A summary of mission and system performance requirements for large space antennas N83-26885
The effects of mesh reflecting surfaces upon radiometric measurements N83-26894
Development of improved analytical models for mesh reflector surfaces N83-26895
A survey of near-field testing methods for large aperture antennas and future trends N83-26896
Auxiliary propulsion requirements for large space systems
[NASA-TM-83368] N83-26922
A new technique for reducing radar response to signals entering antenna sidelobes
[AD-A125191] N83-27101
ANTENNA COMPONENTS
Shape determination/identification for large space antennas N83-26885
Scanning beam antenna conceptual design for 20/30 GHz satellite systems N83-26889
Multimission advanced configuration N83-26890
Large space antenna communications systems: Integrated Langley Research Center/Jet Propulsion Laboratory development activities. 2: Langley Research Center activities N83-26892
Large space antenna communications systems: Integrated Langley Research Center/Jet Propulsion Laboratory development activities. 3: Jet Propulsion Laboratory activities N83-26893
ANTENNA DESIGN
Large Space Antenna Systems Technology, part 1
[NASA-CP-2269-PT-1] N83-26853
Structures for large precision reflectors N83-26871
Survey of deployable antenna concepts N83-26872
Wrap-rib antenna concept development overview N83-26873
Status of deployable geo-truss development N83-26875
Box truss development and applications N83-26876
Inflated antennas N83-26877
Electrostatically figured membrane reflectors: An overview N83-26878
Scanning beam antenna conceptual design for 20/30 GHz satellite systems N83-26889
Multimission advanced configuration N83-26890
Large space antenna communications systems: Integrated Langley Research Center/Jet Propulsion Laboratory technology development activities. 1: Introduction N83-26891
Large space antenna communications systems: Integrated Langley Research Center/Jet Propulsion Laboratory development activities. 2: Langley Research Center activities N83-26892
Large space antenna communications systems: Integrated Langley Research Center/Jet Propulsion Laboratory development activities. 3: Jet Propulsion Laboratory activities N83-26893
The effects of mesh reflecting surfaces upon radiometric measurements N83-26894
Development of improved analytical models for mesh reflector surfaces N83-26895
A survey of near-field testing methods for large aperture antennas and future trends N83-26896
ANTENNA FEEDS
Large space antenna communications systems: Integrated Langley Research Center/Jet Propulsion Laboratory technology development activities. 1: Introduction N83-26891
Large space antenna communications systems: Integrated Langley Research Center/Jet Propulsion Laboratory development activities. 3: Jet Propulsion Laboratory activities N83-26893
ANTENNA RADIATION PATTERNS
A 15-meter deployable aperture microwave radiometer N83-26862
INTELSAT 6 antenna system design and development N83-26888
Large space antenna communications systems: Integrated Langley Research Center/Jet Propulsion Laboratory development activities. 2: Langley Research Center activities N83-26892
A survey of near-field testing methods for large aperture antennas and future trends N83-26896
Near-field measurement facility plans at Lewis Research Center N83-26897
ANTENNAS
A 15-meter deployable aperture microwave radiometer N83-26862
Systems design and comparative analysis of large antenna concepts N83-26863
A summary of mission and system performance requirements for large space antennas N83-26885
Advances in structural concepts N83-26888
Engineering Research Division publication report, calendar year 1981 — bibliography
[DE82-016066] N83-27265
ANTIMONY COMPOUNDS
Synthetic studies of antimony sulfur iodide and predictions/synthesis of new nitrogen containing crystal structures
[AD-A124977] N83-27881
ANTIREFLECTION COATINGS
Low emissivity and solar control coatings on architectural glass N83-27359
Materials for transparent heat mirror coatings N83-27360
Heat mirrors on plastic sheet using transparent oxide conducting coatings N83-27364
ANTISUBMARINE WARFARE
Modeling human decision processes in command and control
[AD-A125218] N83-27595
APERTURES
Analysis of streak-camera measurement errors caused by misorientation of the camera slit with recording direction
[DE83-005970] N83-27197
APPROACH CONTROL
A flight-test and simulation evaluation of the longitudinal final approach and landing performance of an automatic system for a light wing loading STOL aircraft
[NASA-TM-84270] N83-26845
APPROPRIATIONS
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984 N83-27919
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984: National Aeronautics and Space Administration N83-27920
APPROXIMATION
Computation of incompressible potential flow over an airfoil using a high order aerodynamic panel method based on circular arc panels
[AD-A124896] N83-26825
A new approach for solving simultaneous resource possession problems in closed queueing networks
[AD-A124877] N83-27637
An asymptotically orthonormal polynomial family
[AD-A125268] N83-27644
On the relationship between functions with the same optimal knots in spline with piecewise polynomial approximation
[AD-A125002] N83-27662
One-sided tolerance limits for balanced one-way ANOVA random model
[AD-A125026] N83-27669
Acceptance control charts based on the exact and normal approximations to the binomial distributions
[AD-A124964] N83-27686
A simple approximation for bivariate normal probabilities
[AD-A125033] N83-27687
Approximation methods for the distribution of random sums N83-27692
APTITUDE
Validation of brain event-related potentials as indicators of cognitive styles, abilities, and aptitudes
[AD-A125292] N83-27593
AQUATIC PLANTS
Large-scale operations management test of use of the White Amur for control of problem aquatic plants. Part 4. Third year poststocking results. Volume 6. The water and sediment quality of Lake Conway, Florida
[AD-A124443] N83-27479
AQUEOUS SOLUTIONS
An instrument for measuring dynamic surface tension — jet flow
[VTT-140] N83-27198
AQUICULTURE
Pacific Northwest Laboratory report to the DOE Office of Energy Research. Part 2: Environmental sciences
[DE83-007586] N83-27481
Ecological effects of coal conversion N83-27484
AQUIFERS
Utility geothermal plans, Texas and Louisiana N83-27373
Aquifer thermal-energy-storage costs with a seasonal-chill source
[DE83-006700] N83-27382
ARC WELDING
Welding technology for energy conversion N83-27216
Materials and welding process development for nuclear application in the Federal Republic of Germany N83-27217

Welding technologies and materials for energy applications in Japan N83-27218
Welding practices in fossil-fired units N83-27219
Processes quality assurance and examination of weld metal overlays N83-27220
Hardfacing materials and processes for valve applications N83-27221
Performance of the CaF sub 2-CaO-SiO sub 2 system as a submerged arc welding flux for a niobium based HSLA steel N83-27231
Toughness of submerged arc weld metals of controlled rolled Nb bearing steel N83-27232

ARCHES
Joint opening nonlinear mechanism: Interface smeared crack model
[PB83-149195] N83-27084

ARCHITECTURE
Performance and sputtering criteria of modern architectural glass coatings N83-27366
Application of computer modeling to the study of the thermodynamic forces acting on a building
[AD-A125227] N83-27894

ARCTIC OCEAN
Summer decay and retreat of a sea ice cover
[AD-A125124] N83-27560

ARGENTINA
Research and development of LANDSAT-based crop inventory techniques
[E83-10359] N83-27325

ARGON
Effective charge of low-velocity nitrogen, neon and argon ions in carbon, aluminum and gold N83-27716

ARID LANDS
Monitoring land degradation in southern Tunisia: A test of LANDSAT imagery and digital data
[E83-10320] N83-27308

ARIZONA
Candidate sites for future hot-dry-rock development in the United States
[DE83-007103] N83-27525

ARM (ANATOMY)
Comparative analysis of positive and negative lateral acceleration on isometric fatigue
[AD-A124752] N83-27587

ARMED FORCES (UNITED STATES)
Terminal forecast reference notebook for Rhein Main AB, Germany
[AD-A124984] N83-27547
AICUZ (Air Installation Compatible Use Zone) report
[AD-A124974] N83-27801

ARRAYS
Potential of minicomputer/array-processor system for nonlinear finite-element analysis
[NASA-TM-84566] N83-27259
A compilation of moored instrument data and associated oceanographic observations. Volume 30: Gulf Stream extension and Norwegian Sea overlow intrusion experiments, 1979 - 1980
[AD-A124818] N83-27562

ARTHROPODS
Terrestrial and riverine ecology N83-27482

ARTIFICIAL INTELLIGENCE
Quaternions in computer vision and robotics
[AD-A125876] N83-27600
NIGEL: A systemic grammar for text generation
[AD-A125253] N83-27622

ARTIFICIAL SATELLITES
An experimental analysis in modern modal control
[AD-A124839] N83-26908
Autonomous spacecraft design and validation methodology handbook
[NASA-CR-172678] N83-26920

ASHES
H2S removal from coal gas at mid temperature (150 to 200 deg C)
[DE82-011004] N83-26963
The beneficiation of power station coal ash and its use in heavy clay ceramics
[AERE-R-10806] N83-27031
Calculation of calorific value of coal/char from its ultimate analysis
[DE82-012879] N83-27899

ASSAYING
Rapid, quantitative determination of bacteria in water — adenosine triphosphate
[NASA-CASE-GSC-12158-1] N83-27569

ASSEMBLY LANGUAGE
Assembly language coding for CLASSY
[E83-10309] N83-27299

ASTRONOMICAL OBSERVATORIES
Large deployable reflector: An infrared and submillimeter orbiting observatory N83-26858
Antenna technology for orbital Very Long Baseline Interferometry (VLBI) N83-26859

ASTROPHYSICS
NASA/Goddard Space Flight Center contributions to the Workshop on Positron-Electron Pairs in Astrophysics
[NASA-TM-85027] N83-27926
Criteria for grasar action in astrophysical sources N83-27937

ASYMPTOTES
An asymptotically orthonormal polynomial family
[AD-A125266] N83-27644

ATLANTIC OCEAN
Bathymetric data and analysis for the NRL remote sensing experiment: Phelps Bank, July 1982
[AD-A125220] N83-27563

ATMOSPHERIC ATTENUATION
Study on spectral/radiometric characteristics of the thematic mapper for land use applications
[E83-10348] N83-27323

ATMOSPHERIC BOUNDARY LAYER
Atmospheric boundary layer studies N83-27491
Atmospheric boundary layer studies N83-27493
A mathematical model of the urban boundary layer — atmospheric models
[TULEA-1982-09] N83-27515
Modeling the turbulence structure of the adiabatic atmospheric boundary layer
[TULEA-1982-12] N83-27532

ATMOSPHERIC CHEMISTRY
High altitude jet fuel photochemistry
[AD-A125095] N83-27035
Pacific Northwest Laboratory report to the DOE Office of Energy Research. Part 3: Atmospheric sciences
[DE83-007472] N83-27488
Transformation of energy-related pollutants N83-27489
Atmospheric boundary layer studies N83-27493
Meteorological Effects of Thermal Energy Releases (METER) program
[DE83-008313] N83-27502
Processes of atmospheric deposition of metals and acids to forests
[DE82-017442] N83-27504
Proceedings of the Carbon Dioxide Research Conference: Carbon Dioxide, Science and Consensus
[DE83-007182] N83-27551

ATMOSPHERIC CIRCULATION
Observation and measurement of air flow over water waves
[NMI-R-122] N83-27145

ATMOSPHERIC COMPOSITION
Particle resuspension and translocation N83-27496
Literature review of sampling probes. Phase 5: Probe inlet design
[DE82-017327] N83-27505
Aircraft measurements of trace gases and particles near the tropopause
[NASA-CR-3691] N83-27542

ATMOSPHERIC DIFFUSION
Atmospheric diffusion in complex terrain N83-27490
Atmospheric diffusion in complex terrain N83-27492

ATMOSPHERIC EFFECTS
Atmospheric effects on METSAT data
[E83-10314] N83-27303
The sensitivity of numerically simulated climates to land-surface boundary conditions
[NASA-TM-83985] N83-27536

ATMOSPHERIC ENTRY
Numerical computation of the matrix Riccati equation for heat propagation during space shuttle reentry
[AD-A124873] N83-26916

ATMOSPHERIC MODELS
A mathematical model of the urban boundary layer — atmospheric models
[TULEA-1982-09] N83-27515

ATMOSPHERIC MOISTURE
ARIS: Acid Rain Information System
[DE83-007026] N83-27512
The impact of conventional surface data upon VAS regression retrievals in the lower troposphere
[NASA-TM-83987] N83-27522

ATMOSPHERIC PRESSURE
Experiments on focusing systems in laser initiated discharge channels
[AD-A125296] N83-27207
Optical coatings by conveyorized atmospheric Chemical Vapor Deposition (CVD) N83-27368

ATMOSPHERIC TURBULENCE
A mathematical model of the urban boundary layer — atmospheric models
[TULEA-1982-09] N83-27515
Modeling the turbulence structure of the adiabatic atmospheric boundary layer
[TULEA-1982-12] N83-27532
Report on the West Sole Wind Structure Project 1982 — wind profiles at a North Sea offshore platform
[NMI-R-145] N83-27535

ATOMIC PHYSICS
Rate processes in gas phase
[NASA-RP-1090] N83-27809

ATOMIC STRUCTURE
Deep impurities: A crystalline cluster approach
[INPE-2717-PRE/303] N83-27878
Electronic-energy-band structure of uranium hydride
[DE82-016393] N83-27884

ATTENUATION
Low-temperature ultrasonic attenuation in rapidly cooled niobium containing oxygen and hydrogen
[DE82-012717] N83-27806

ATTITUDE CONTROL
Satellite systems requirements for land mobile communications N83-26856
An experimental analysis in modern modal control
[AD-A124839] N83-26908

AUDIO FREQUENCIES
A method for testing components in the high acceleration frequency range
[TULEA-1981-18] N83-27269

AUDITORY PERCEPTION
Speech intelligibility in closed large scale environments
[FUB-24-1982] N83-27123

AUGER EFFECT
Interaction of hydrogen molecular ions with thin foils. Part 3: Inner-shell ionization N83-27723

AUGMENTATION
Computer simulation of a multiaxis air-to-air tracking task using the optimal pilot control model
[AD-A125302] N83-27597

AURORAL ARCS
Auroral kilometric radiation/aurora correlation
[NASA-TM-85035] N83-27516

AURORAL IRRADIATION
Auroral kilometric radiation/aurora correlation
[NASA-TM-85035] N83-27516
Ordinary mode auroral kilometric radiation, with harmonics, observed by ISIS 1
[NASA-TM-85036] N83-27517

AURORAS
Ionospheric irregularities and their potential impact on synthetic aperture radars
[AD-A124942] N83-27100

AUSTENITE
A study of the effect of interrupted quenches on a thermomechanically processed high carbon steel
[AD-A124985] N83-26996
Comparison of neutron and heavy-ion damage in a stable austenite
[DE82-017369] N83-27009

AUSTENITIC STAINLESS STEELS
Kinetics of hydrogen-induced stress corrosion cracking. Part 1: Important features of cracking with regard to high strength steels
[BLL-RISLEY-TRANS-4701(9091.9F)] N83-26990
Materials and welding process development for nuclear application in the Federal Republic of Germany N83-27217

AUSTRALIA
Australia ground data collection 1981-82 crop year, appendixes A and B, volume 2
[E83-10316] N83-27305
Australia ground data collection 1981-82 crop year, volume 1
[E83-10317] N83-27306

AUTOCORRELATION
Spectral analysis with an exponential window iterative method: The performance of the signal frequency evaluation — voice signal processing
[FUB-15-1982] N83-27116
Effects of autocorrelation upon LANDSAT classification accuracy — Richmond, Virginia and Denver, Colorado
[E83-10328] N83-27312

AUTOMATIC CONTROL
Autonomous spacecraft design and validation methodology handbook
[NASA-CR-172678] N83-26920
Engineering and manufacture of a high-efficiency, automatic defrosting refrigerator-freezer
[DE82-017480] N83-27065
Design and simulation of a unique signal mechanism
[DE82-011568] N83-27110
Determining light intensity for use with intermittent or rotating prism cameras utilizing a cinematographic light-intensity translator
[DE82-015414] N83-27189
Improvement of fusion welding through modelling, measurement and real-time control N83-27226
Robotics in welding N83-27227
Status of the Argonne superconducting-linac heavy-ion booster N83-27730
Evolution of the racetrack microtron control system N83-27760

Use of analytical mechanics in defining acoustic-test methodology
[DE82-018615] N83-27802
Database automation of accelerator operation
[DE82-017525] N83-27915
AUTOMATIC FLIGHT CONTROL
Technology needs for Air Force autonomous spacecraft
[NASA-CR-172677] N83-26921
AUTOMATIC PILOTS
Space flight experience with the Shuttle Orbiter control system N83-26900
AUTOMATIC TEST EQUIPMENT
Interfacing a torsion pendulum with a microcomputer
[DE83-004032] N83-27792
AUTOMOBILE ENGINES
DOE/NASA Automotive Stirling Engine Project overview '83
[NASA-TM-83405] N83-27924
Automotive Stirling Engine Development Program
[NASA-CR-168074] N83-27925
Concept evaluation of automotive propulsion using liquid air/nitrogen
[DE82-016992] N83-27927
AUTOMOBILE FUELS
Increased automobile fuel efficiency and synthetic fuels: Alternatives for reducing oil imports. Background paper number 2: Selected technical and economic comparison of synthetic options
[PB83-147363] N83-27057
AUTOMOBILES
Potential of composite materials in surface transportation applications
[DE83-007218] N83-26931
Combustion losses in automotive spark ignition and diesel engines
[DE83-006015] N83-27244
Assessment of water addition to spark ignition engines
[DE83-006013] N83-27245
Application of numerical simulation methodology to automotive combustion
[DE82-015912] N83-27247
AUTONOMIC NERVOUS SYSTEM
Morphological effects of chronic action of SHF field on nervous system of mice N83-27574
AUTONOMY
Autonomous spacecraft design and validation methodology handbook
[NASA-CR-172678] N83-26920
Technology needs for Air Force autonomous spacecraft
[NASA-CR-172677] N83-26921
AUTORADIOGRAPHY
Biomedical applications of digital autoradiography with a MWPC
[DE82-017055] N83-27571
AUTOREGRESSIVE PROCESSES
Unsteady models, vectorial autoregressive models, and Levinson's algorithm
[ENST-D-82005] N83-27676
AUXILIARY PROPULSION
Auxiliary propulsion requirements for large space systems
[NASA-TM-83388] N83-26922
AVAILABILITY
Intermediate photovoltaic system application experiment operational performance report for G. N. Wilcox Hospital, Kauai, Hawaii for September 1982, volume 5
[DE83-006843] N83-27454
Intermediate photovoltaic system application experimental operational performance report for Newman Power Station, El Paso, Texas for September 1982, volume 15
[DE83-006845] N83-27459
Intermediate photovoltaic system application experiment operational performance report for Beverly High School, Beverly, Massachusetts for August 1982, volume 12
[DE83-007092] N83-27460
AVIONICS
High-gain error actuated flight control systems for continuous linear multivariable plants
[AD-A124871] N83-26848
AXIAL COMPRESSION LOADS
A finite element analysis of the creep response of lumbar intervertebral joints in the Rhesus monkey
[AD-A124740] N83-27570
AXIAL FLOW
The use of vortex generators as inexpensive compressor casing treatment N83-26798
End wall flow characteristics and overall performance of an axial flow compressor stage
[NASA-CR-3671] N83-26819
Finite element program for calculating flows in turbomachines with results for NASA task-1 compressor
[AD-A124987] N83-26841
AXIAL FLOW TURBINES
Calculation of the unsteady flow through relatively moving blade rows and the unsteady blade forces
[PNR-90158] N83-27183
Investigation of the coupling of unsteady lift to low order acoustic duct modes in an axial flow fan
[AD-A124819] N83-27796
AXIAL STRESS
The 48 hour multiaxial creep and recovery of 2618 aluminum alloy at 200C
[AD-A124993] N83-26998
AXISYMMETRIC FLOW
The energy balance in axisymmetric steady compressible swirl flows with closed streamlines N83-26789

B

BACKGROUND RADIATION
Electron-positron annihilation and the cosmic X-ray background N83-27935
BACKSCATTERING
Brillouin backscatter from gas-jet targets illuminated by a multi-line laser source
[DE82-012586] N83-27206
Stopping power of rare gases in amorphous silicon for MeV helium ions N83-27707
Medium dependence of charge state fractions of MeV He beam N83-27718
BACTERIA
Development of a biochemical process for production of alcohol fuel from peat
[DE82-016692] N83-27039
Engineering analysis of potential photosynthetic bacterial hydrogen-production systems
[DE82-019151] N83-27414
Rapid, quantitative determination of bacteria in water — adenosine triphosphate
[NASA-CASE-GSC-12158-1] N83-27569
The 2.8 to 3.6 micron spectra of micro-organisms with varying H2O-ice content N83-27942
BAINITIC STEEL
Response of bainitic 2 1/4 Cr-1 Mo steel to creep-fatigue loadings at 482 deg C
[DE82-017445] N83-27011
BALL BEARINGS
Hybrid hydrostatic/ball bearings in high-speed turbomachinery
[NASA-CR-168124] N83-27213
BALLOON-BORNE INSTRUMENTS
Application of a bubble memory to a balloon-borne data system
[DE82-018415] N83-27611
BALMER SERIES
Interaction of hydrogen molecular ions with thin foils. Part 2: Balmer emission N83-27722
BANACH SPACE
Some remarks on the continuation method of Leray-Schauder-Rabinowitz and the method of monotone iterations
[AD-A125267] N83-27645
BAND STRUCTURE OF SOLIDS
A local single particle self energy for the Hubbard model
[INPE-2736-PRE/316] N83-27810
Deep impurities: A crystalline cluster approach
[INPE-2717-PRE/303] N83-27878
BARLEY
Technical summary of accomplishments made in preparation for the USSR barley exploratory experiment
[E83-10315] N83-27304
Australia ground data collection 1981-82 crop year, appendixes A and B, volume 2
[E83-10316] N83-27305
Australia ground data collection 1981-82 crop year, volume 1
[E83-10317] N83-27306
BAROCLINIC WAVES
Numerical simulation of the influence of small scale mountain ranges on a baroclinic wave
[AD-A125301] N83-27546
BASES (CHEMICAL)
Chromatography of coal derived oil
[BLL-T5991/BG/MRA14684/82] N83-26935
BATHYMETERS
Laser safety of air bathymetry
[FOA-C-30292-E1] N83-27210
Bathymetric data and analysis for the NRL remote sensing experiment: Phelps Bank, July 1982
[AD-A125220] N83-27563
BAYES THEOREM
Estimation of launch vehicle performance parameters from 2 orbiting sensors
[AD-A124802] N83-26907
Sensitivity of Bayes inference with ignorable but data-dependent stopping rules
[AD-A125306] N83-27685
BEADS
A microprocessor-controlled bead puller for RF cavity measurements N83-27738
Tuning experience with the FMIT scale-model drift-tube linac N83-27741
BEAM CURRENTS
Proceedings of the 1981 Linear Accelerator Conference
[DE82-013754] N83-27724
Octupole focusing in transport and acceleration systems N83-27731
Comparison of the initial ETA gas-propagation experiments with theoretical models
[DE82-015415] N83-27843
BEAM INJECTION
Status report on operation and upgrading of the Unilac N83-27727
An RFQ linac for heavy ion acceleration N83-27787
Comparison of the initial ETA gas-propagation experiments with theoretical models
[DE82-015415] N83-27843
BEAM INTERACTIONS
Beam parameter measurements for the SLAC linear collider N83-27753
Transverse coherent instabilities and a dipole feedback damper for coexisting coasting and bunched beams
[DE82-016613] N83-27869
BEAM NEUTRALIZATION
Modeling beam-front dynamics at low gas pressures
[DE82-016636] N83-27842
BEAMS (RADIATION)
Beam parameter measurements for the SLAC linear collider N83-27753
The 1981 Linear Accelerator Conference on Proton Beam Emittance Growth in Linac N83-27755
Beam broadening in a strongly scattering target in the analytical electron microscope
[DE82-014085] N83-27825
BEAMS (SUPPORTS)
Advances in structural concepts N83-26868
Evaluation of mounting bolt loads for Space Shuttle Get Away Special (GAS) adapter beam
[NASA-TM-84988] N83-26910
Moment-rotation characteristics of semi-rigid steel beam-column connections
[PB83-145318] N83-27081
Composite beams from a statistical point of view
[TULEA-1982-05-T] N83-27273
BEDS (GEOLOGY)
Sedimentology of the Mesaverde formation of Rifle Gap, Colorado and implications for gas-bearing intervals in the subsurface
[DE82-013396] N83-27530
BEHAVIOR
Household energy conservation: Strategies for behavioral research
[RAND/N-1909-DOE] N83-27349
BENDING
An experimental analysis in modern modal control
[AD-A124839] N83-26908
Bending of laminated anisotropic shells by a shear deformable finite element
[PB83-145409] N83-27278
A new look at turbulence experienced by a rotating wind turbine
[DE83-007044] N83-27383
BENEFICIATION
The beneficiation of power station coal ash and its use in heavy clay ceramics
[AERE-R-10806] N83-27031
BERING SEA
Summer decay and retreat of a sea ice cover
[AD-A125124] N83-27560
BETA PARTICLES
The Gamow-Teller strength functions and neutrino problems
[DE82-018357] N83-27828
BIBLIOGRAPHIES
Aeronautical Engineering: A continuing bibliography, 1982 cumulative index
[NASA-SP-7037(157)] N83-26784
Engineering Research Division publication report, calendar year 1981 — bibliography
[DE82-016086] N83-27265
Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 246)
[NASA-SP-7011(246)] N83 27579
National Energy Software Center: Compilation of program abstracts
[DE83-001550] N83-27630

BICRYSTALS
Fluxoid pinning by grain boundaries in bicrystals and polycrystals of niobium
[DE82-017406] N83-27891
BIHARMONIC EQUATIONS
A class of biharmonic end-striping problems arising in elasticity and Stokes flow
[AD-A125305] N83-27853
BINARY CODES
DRAC: A user-friendly computer code for modeling transient thermohydraulic phenomena in solar-receiver tubing
[DE83-007091] N83-27458
BINARY DATA
Decoding and synchronization of error correcting codes
[ENST-E-83001] N83-27113
BINARY MIXTURES
A general approach to the testing of binary solubility systems for thermodynamic consistency. Consolidated Fuel Reprocessing Program
[DE83-007173] N83-27897
BINOCULAR VISION
A model for human visual processing which explains perceptions of motion-after-effects
[AD-A124842] N83-27588
BINOMIALS
Acceptance control charts based on the exact and normal approximations to the binomial distributions
[AD-A124964] N83-27686
BIOASSAY
Ecological effects of coal conversion N83-27484
BIOCHEMISTRY
Development of a biochemical process for production of alcohol fuel from peat
[DE82-016692] N83-27039
Urban-waste program research and development 1978-1981: An overview
[DE82-019788] N83-27514
BIOCONVERSION
Biological production of liquid fuels from biomass
[DE82-008652] N83-27048
TVA/DOE integrated onfarm alcohol production system, phase 2
[DE82-016973] N83-27049
BIODEGRADATION
Development of a biochemical process for production of alcohol fuel from peat
[DE82-016692] N83-27039
BIODYNAMICS
On the quantitative analysis of liquid flow in physiological tubes
[AD-A125284] N83-27155
Terrestrial and riverine ecology N83-27482
Marine research N83-27483
Radionuclide fate and effects N83-27486
A finite element analysis of the creep response of lumbar intervertebral joints in the Rhesus monkey
[AD-A124740] N83-27570
BIOENGINEERING
USSR report: Life sciences. Effects of nonionizing electromagnetic radiation, no. 9
[JPRS-83601] N83-27572
Bio-medical flow sensor — intrvenous procedures
[NASA-CASE-MSC-18761-1] N83-27577
BIOLOGICAL EFFECTS
Biological effects of radio-frequency radiation N83-27105
Responses of airborne biota to microwave transmission from satellite power system
[DE83-006495] N83-27498
Investigation of adaptive processes in peripheral blood using mathematical modeling methods N83-27575
Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 246)
[NASA-SP-7011(246)] N83-27579
BIOLOGICAL MODELS (MATHEMATICS)
Ecological effects of coal conversion N83-27484
BIOLUMINESCENCE
Rapid, quantitative determination of bacteria in water — adenosine triphosphate
[NASA-CASE-GSC-12158-1] N83-27569
BIOMASS
Development of a pressurized fluidized-bed biomass gsifier to produce substitute fuels
[DE82-013265] N83-27401
Biomass-energy-technology program summary
[DE82-018926] N83-27426
Testimony presented to Subcommittee on Energy Development and Applications, US House of Representatives. Hearings on renewable energy in the eighties: Needs for further research, development and demonstration
[DE82-017407] N83-27430
Evaluation of biomass systems for electricity generation
[DE82-901865] N83-27436
BIOMASS ENERGY PRODUCTION
Flash pyrolysis and hydropyrolysis of biomass
[DE82-015807] N83-26951
Biological production of liquid fuels from biomass
[DE82-008652] N83-27048
TVA/DOE integrated onfarm alcohol production system, phase 2
[DE82-016973] N83-27049
The feasibility of biogas production on farms
[DE83-007385] N83-27385
Hydropyrolysis of biomass and related materials for the production of liquids
[DE82-012928] N83-27402
Evaluation of biomass systems for electricity generation
[DE82-901865] N83-27436
BIOMEDICAL DATA
Biomedical applications of digital autoradiography with a MWPC
[DE82-017055] N83-27571
BIONICS
Terrestrial and riverine ecology N83-27482
Ecological effects of coal conversion N83-27484
BIOPHYSICS
Ionization by fast charged particles
[DE82-014849] N83-27823
BIRDS
Responses of airborne biota to microwave transmission from satellite power system
[DE83-006495] N83-27498
BISMUTH COMPOUNDS
Scintillation analysis of gamma radiation with crystals of bismuth germanate
[AD-A124991] N83-27882
BIVARIATE ANALYSIS
A simple approximation for bivariate normal probabilities
[AD-A125033] N83-27687
BLACK AND WHITE PHOTOGRAPHY
Mathematical modeling of black-and-white chromogenic image stability
[AD-A125248] N83-27186
BLACK HOLES (ASTRONOMY)
Gamma-gun in the center of the galaxy
[REPT-757] N83-27945
BLADE TIPS
Aerodynamic research on Tipvane windturbines
[PB83-147413] N83-27476
BLANKETS (FISSION REACTORS)
Preliminary calculations for testing a fission/fusion hybrid biandket module in a fission reactor: Addendum 2
[DE82-015622] N83-27860
BLOCH BAND
Current stopping power analyses N83-27701
BLOCKS
Box truss development and applications N83-26876
BLOOD
Recovery from short term intense exercise: its relation to capillary supply and lactate release
[AD-A124965] N83-27584
BLOWERS
How to solve materials and design problems in solar heating and cooling, Energy Technology Review No. 77
[DE83-006116] N83-27456
BLOWOUTS
Coaxial dump combustor investigations N83-26791
BLUNT BODIES
Boundary-layer transition on blunt, slender cones at hypersonic Mach numbers N83-26794
Computational fluid dynamics: An engineering tool? N83-26796
BODIES OF REVOLUTION
General relations for exact and inexact involute bodies of revolution
[AD-A124849] N83-27201
BODY FLUIDS
On the quantitative analysis of liquid flow in physiological tubes
[AD-A125284] N83-27155
BODY MEASUREMENT (BIOLOGY)
Apparatus for determining changes in limb volume
[NASA-CASE-MSC-18759-1] N83-27578
BODY TEMPERATURE
Effects of sleep deprivation on thermoregulation during exercise
[AD-A124982] N83-27580
Sleep deprivation depresses thermoregulatory responses to physical exercise
[AD-A125062] N83-27581
A linearized, time dependent model of the heat transfer and thermoregulatory responses occurring upon immersion in cold water
[AD-A124972] N83-27586
BODY VOLUME (BIOLOGY)
Apparatus for determining changes in limb volume
[NASA-CASE-MSC-18759-1] N83-27578
BOILERS
High temperature properties of the seam weld portion in 1% Cr-0.5% Mo ERW boiler tubing after long-term aging N83-27223
Welding equipment and process development for inaccessible tube-to-tubesheet welding on a sodium-heated steam generator N83-27236
Project DEEP STEAM
[DE82-016394] N83-27389
Downhole steam-generator study. Volume 1: Conception and feasibility evaluation
[DE82-018348] N83-27424
Waste-to-energy compendium: Revised 1982 edition
[DE82-020328] N83-27471
Acid rain: Control strategies for coal-fired utility boilers, volume 1
[DE83-006695] N83-27511
BOLTS
Evaluation of mounting bolt loads for Space Shuttle Get Away Special (GAS) adapter beam
[NASA-TM-84988] N83-26910
BOMBS (ORDNANCE)
The numerical solution of pressure oscillations in an open cavity N83-26793
BOOLEAN FUNCTIONS
STOP: A fast method of disjointing binary product sets
[DE83-007463] N83-27670
BOOMS (EQUIPMENT)
Earth observation system: Spacecraft design N83-26861
BOREHOLES
Behavior of a rigid inclusion stressmeter in an anisotropic field
[DE82-016063] N83-27188
BORON
Boron-containing fuel-rich HTBP propellants. Manufacturing, burning experiments and specific impulse calculations
[FOA-C-20483-D1] N83-27055
BOUNDARIES
The brine zone in the McMurdo Ice Shelf, Antarctica
[AD-A124516] N83-27558
BOUNDARY LAYER EQUATIONS
Calculation of boundary layers near the stagnation point of an oscillating airfoil
[NASA-TM-84305] N83-27148
BOUNDARY LAYER FLOW
Dynamic response of ramjet inlets to downstream perturbations
[AD-A125295] N83-27157
Application of a new version of the k-W model of turbulence to equilibrium boundary layer flow over a flat plate with: (1) intense heat transfer and (2) streamwise adverse pressure gradients
[CFD/82/14] N83-27181
Application of a new version of the k-W model of turbulence to a boundary layer with mass transfer
[CFD/82/15] N83-27182
A mathematical model of the urban boundary layer — atmospheric models
[TULEA-1982-09] N83-27515
Modeling the turbulence structure of the adiabatic atmospheric boundary layer
[TULEA-1982-12] N83-27532
BOUNDARY LAYER SEPARATION
A collection of papers in the aerospace sciences
[AD-A122667] N83-26787
Experimental studies of the separating confluent boundary-layer. Volume 1: Summary
[NASA-CR-3655] N83-26822
Observation and measurement of air flow over water waves
[NMI-R-122] N83-27145
BOUNDARY LAYER TRANSITION
Boundary-layer transition on blunt, slender cones at hypersonic Mach numbers N83-26794
BOUNDARY LAYERS
A note on adaptive wind tunnels with imperfect control N83-26792
A note on the oscillation of cavities coupled to aerodynamic flows N83-26795
On the large scale structure of turbulence in boundary layer and shear flows N83-26800
End wall flow characteristics and overall performance of an axial flow compressor stage
[NASA-CR-3671] N83-26819
Oblique interactions of detonation waves with explosive/metal interfaces
[DE83-007119] N83-27038
Calculation of boundary layers near the stagnation point of an oscillating airfoil
[NASA-TM-84305] N83-27148

Implicit upwind methods for the compressible Navier-Stokes equations
[NASA-TM-84364] N83-27149
Boundary conditions for suppressing rapidly moving components in hyperbolic systems, 1
[AD-A120962] N83-27164
Experimental results of pitching moment tests on parabolic-trough solar-collector array configurations
[DE83-006027] N83-27446
Kahuku kite wind study. 1: Kahuku beach boundary layer
[DE83-006403] N83-27553

BOUNDARY VALUE PROBLEMS
Three-dimensional wave propagation using boundary integral equation techniques
[AD-A124956] N83-27103
On steady vortex flow in two dimensions, 2
[AD-A120966] N83-27163
Lax-Wendroff methods for hyperbolic history value problems
[AD-A125283] N83-27649
A class of biharmonic end-striping problems arising in elasticity and Stokes flow
[AD-A125305] N83-27653
Differentiation and generation of Taylor coefficients in PASCAL-SC
[AD-A125246] N83-27655
Linear parabolic equations with a singular lower order coefficient
[AD-A125245] N83-27656
The stability of one-step schemes for first-order two-point boundary value problems
[AD-A125240] N83-27659
On the numerical solution of some 2-D electromagnetic interface problems by the boundary collocation method
[AD-A125269] N83-27666

BOW WAVES
Boundary-layer transition on blunt, slender cones at hypersonic Mach numbers N83-26794

BRANCHING (MATHEMATICS)
Anomalies in parallel branch-and-bound algorithms
[AD-A125290] N83-27648

BRAZIL
Mapping of land use and geomorphology in the APAPORE project area by LANDSAT satellite data, volume 2
[E83-10333] N83-27281
Mapping of land use and geomorphology in the APAPORE project area by LANDSAT satellite data, volume 3
[E83-10334] N83-27282
Evaluation of ground cover and land use in the PDRI-AM remote sensing technique program area — Brazil
[E83-10230] N83-27283
Mapping of land use and geomorphology in the APAPORE project area by LANDSAT satellite data, volume 1
[E83-10332] N83-27314
Remote Sensing techniques used to characterize soil erosion in southwestern Sao Paulo state — Brazil
[E83-10339] N83-27315
Geologic mapping of the Bauru Group in Sao Paulo state by LANDSAT images — Brazil
[E83-10341] N83-27316
The Ponta Grossa Arch: A proposal for its configuration and evolution from the interpretation of remote sensing data
[E83-10343] N83-27320
Contrasts between wet and dry periods within the 1981 rainy season in northeast Brazil
[INPE-2728-PRE/310] N83-27539
Synoptic precursors of three severe Brazilian freezes in the Pacific Ocean and South America
[INPE-2730-PRE/312] N83-27541

BRAZING
Brazing techniques and alloys for accelerator RF components N83-27742

BREAKDOWN
Anode phenomena in vacuum arcs
[DE83-007181] N83-27141

BREATHING APPARATUS
Evaluation and performance of closed-circuit breathing apparatus
[DE82-015877] N83-27601

BREEDER REACTORS
Design and constraints for the ZEBRA injector, RFQ and DTL N83-27736
Beam dynamics studies of high current RFQ and DTL tanks N83-27756
Preliminary calculations for testing a fission/fusion hybrid blanket module in a fission reactor: Addendum 2
[DE82-015822] N83-27860

BREMSSTRAHLUNG
Recent results on the dense Z-pinch
[DE82-015802] N83-27859

BRIDGES (STRUCTURES)
Natural Bridges National Monument photovoltaic power plant operations manual
[DE82-015388] N83-27436

BRIDGMAN METHOD
Thermal analysis of the vertical bridgman semiconductor crystal growth technique
[NASA-CR-172627] N83-27875

BRIGHTNESS
Effect of scene illumination conditions on digital enhancement techniques of multispectral scanner LANDSAT images
[E83-10344] N83-27319

BRILLOUIN EFFECT
Brillouin backscatter from gas-jet targets illuminated by a multi-line laser source
[DE82-012586] N83-27206

BRINES
Proceedings of the Sixth Annual Geothermal Conference and Workshop
[DE83-901135] N83-27372
Heber Binary Project. Binary Cycle Geothermal Demonstration Power Plant (RP1900-1) N83-27375
Geothermal scale control by crystallization (RP1525-2) N83-27378
Conceptual design of the Truscott Brine Lake solar pond system. Volume 2: Utility-integrated scenario
[DE83-006133] N83-27386
The brine zone in the McMurdo Ice Shelf, Antarctica
[AD-A124516] N83-27558

BRITTLENESS
Kinetics of void formation in strained metals
[ISSN-0208-5658] N83-26993
Thermo-mechanical and thermal behavior of high-temperature structural materials
[AD-A125242] N83-27026

BROADCASTING
Audio direct broadcast satellites N83-26857

BUBBLE MEMORY DEVICES
Application of a bubble memory to a balloon-borne data system
[DE82-018415] N83-27611

BUBBLES
Kinetics of void formation in strained metals
[ISSN-0208-5658] N83-26993

BUFFER STORAGE
A flow control scheme considering retransmissions in packet switched datagram transport networks
[FUB-32-1982] N83-27125

BUILDINGS
Field experiences underscore the importance of moisture control in energy-efficient homes
[DE83-901234] N83-27364
Handbook of thermal insulation applications
[AD-A125264] N83-27158
City of Tucson solar code
[DE82-016788] N83-27418
Economic evaluation of end-user conservation measures applied to buildings served by a proposed district-heating system
[DE82-016080] N83-27470

BUMPY TORUSES
Research support for plasma diagnostic on Elmo Bumpy Torus. Observations of EBT ring geometry by means of diamagnetic field measurements using a compensated ferromagnetic resonance magnetometer, and a preliminary numerical study of EBT flux penetration dynamics
[DE83-007883] N83-27864

BUNCHING
Transverse coherent instabilities and a dipole feedback damper for coexisting coasting and bunched beams
[DE82-016613] N83-27869

BUOYANCY
Manned assembly of space structures N83-26869

BURNING RATE
Analytical design for internal burning star grains of solid rockets
[AD-A124826] N83-27032

BUTT JOINTS
Creep rupture and creep crack growth behaviour of transition joints N83-27237
Damage accumulation and failure criteria in 'creep brittle' ferritic weldment structures N83-27238

BY-PRODUCTS
Overview of fuel alcohol from agricultural crops with emphasis on the Tennessee Valley
[DE82-016932] N83-27050

BYPASSES
Measurement of model inter-digital H type linac N83-27786

C

CABLES (ROPES)
Hoop/column antenna development program N83-26874

CADMIUM SULFIDES
Development of copper sulfide/cadmium thin-film solar cells
[DE82-014308] N83-27416
Cadmium sulfide/copper ternary heterojunction cell research
[DE83-000997] N83-27451

CADMIUM TELLURIDES
Low-cost, sprayed CdTe solar-cell research
[DE83-007275] N83-27392

CALCIUM
The beneficial effect of zirconium and calcium when jointly microalloyed with high speed steels
[BLL-M-26914-(5828.4)] N83-26992
Calculation of the equilibrium mean charge of helium ions N83-27717
Note on the elastic-scattering of few-MeV neutrons from elemental calcium
[DE82-019476] N83-27827

CALCULATORS
Hand-held computer programs for preliminary helicopter design
[AD-A125036] N83-27624

CALENDARS
AGARD Bulletin: Meetings, publications, membership
[AGARD-BUL-83/1] N83-26786

CALIBRATING
Calibration and related measurement service of the National Bureau of Standards
[PB83-151682] N83-27199
LANDSAT-D flight segment operations manual. Appendix A: Coefficients/calibration data
[E83-10267] N83-27289
User's manual for MODCAL: Bounding surface soil plasticity model calibration and prediction code, volume 2
[AD-A124867] N83-27523
Evaluation of physical and numerical hydraulic models, Masonboro Inlet, North Carolina
[AD-A116110] N83-27557

CALIFORNIA
Candidate sites for future hot-dry-rock development in the United States
[DE83-007103] N83-27525
Tidal and lunar data for Point Mugu, San Nicolas Island, and the Barking Sands area during 1983
[AD-A124810] N83-27565

CALORIMETERS
Gamma-ray for simultaneous calorimetric assay
[DE82-008615] N83-27826

CAMERA SHUTTERS
Overview of pulsers for nanosecond gating of image-shutter tubes
[DE82-019533] N83-27850

CAMERAS
Determining light intensity for use with intermittent or rotating prism cameras utilizing a cinematographic light-intensity translator
[DE82-015414] N83-27189
Analysis of streak-camera measurement errors caused by misorientation of the camera slit with recording direction
[DE83-005970] N83-27197

CANADIAN SHIELD
Geology and mineral resources of the Lake Champlain 1 deg by 2 deg NTMS quadrangle, New Hampshire-New York-Vermont N83-27330

CANOPIES (VEGETATION)
Simulating soybean canopy temperature as affected by weather variables and soil water potential
[E83-10319] N83-27307
Detection of aspen/conifer forest mixes from multitemporal LANDSAT digital data — Bear River Range, Rocky Mountains
[E83-10324] N83-27309
Study to assess the importance of errors introduced by applying NOAA 6 and NOAA 7 AVHRR data as an estimator of vegetative vigor: Feasibility study of data normalization
[E83-10346] N83-27321
Research and development of LANDSAT-based crop inventory techniques
[E83-10359] N83-27325

CAPACITANCE
Low-cost, sprayed CdTe solar-cell research
[DE83-007275] N83-27392
Cadmium sulfide/copper ternary heterojunction cell research
[DE83-000997] N83-27451

Modulator reliability and bandwidth improvement: Replacing tetrodes with MOSFETs N83-27783
Measurement of model inter-digital H type linac N83-27786
Automated C-V and Y omega meson curves for MOS device analysis
[DE82-014268] N83-27886

CAPACITORS
High frequency, high power capacitor development
[NASA-CR-168035] N83-27127
Dielectrics for radiation-hard capacitors: Polyvinylidene fluoride and polyethylene terephthalate
[DE82-019903] N83-27137

CAPILLARIES
Recovery from short term intense exercise: its relation to capillary supply and lactate release
[AD-A124965] N83-27584

CAPTURE EFFECT
Applications of resonance-averaged gamma-ray spectroscopy with tailored beams
[DE82-018098] N83-26955

CARBON
Electrochemical studies at carbon black paste electrodes containing cupric chloride additive
[AD-A125276] N83-26942
Liquid-phase methanation/shift process development
[DE82-015214] N83-26961
Measurement of the carbon activity of sodium with foils consisting of Fe-20Mn and stainless steel types A304L and 316L
[BLL-RISLEY-TRANS-4719(9091.9F)] N83-26969
Dynamic powder compaction of rapidly solidified Path A alloy with increased carbon and titanium content
[DE82-017252] N83-27008
Diesel fuel oils, 1982
[DE83-006115] N83-27051
Stopping power of Ni, Ag, Au and Pb for approximately 7 MeV/n alpha-particles and carbon ions (Z 3/1 proportional deviation from the Bethe formula) N83-27702
Anomalies in the thickness dependence of the energy loss of helium and nitrogen ions in very thin carbon foils N83-27710
Calculation of the equilibrium mean charge of helium ions N83-27717
Medium dependence of charge state fractions of MeV He beam N83-27718
Charge state distribution of light ions at glancing collision N83-27719
Interaction of hydrogen molecular ions with thin foils. Part 1: Convoy electrons N83-27721
Interaction of hydrogen molecular ions with thin foils. Part 2: Balmer emission N83-27722
Interaction of hydrogen molecular ions with thin foils. Part 3: Inner-shell ionization N83-27723
Retention and recycling of plasma-edge hydrogen isotopes in C and TiC
[DE82-019959] N83-27814
Ion-exchange behavior of alkali metals on treated carbons
[DE83-005980] N83-27835

CARBON CYCLE
Proceedings of the Carbon Dioxide Research Conference: Carbon Dioxide, Science and Consensus
[DE83-007182] N83-27551

CARBON DIOXIDE
Catalytic CO2 gasification of graphite vs. coal char
[DE82-016412] N83-26959
High-temperature corrosion of iron in sulfur-containing atmosphere
[DE83-006965] N83-27007
Heat-transfer distributions on biconics at incidence in hypersonic-hypervelocity He, N2, air, and CO2 flows
[NASA-TM-84667] N83-27150
Proceedings of the Carbon Dioxide Research Conference: Carbon Dioxide, Science and Consensus
[DE83-007182] N83-27551

CARBON DIOXIDE LASERS
Modular incoherent CO sub 2 TEA lasers
[AD-A124960] N83-27204
Experiments on focusing systems in laser initiated discharge channels
[AD-A125296] N83-27207

CARBON FIBER REINFORCED PLASTICS
Fiber reinforced composite materials
[TULEA-1981-02] N83-26933
The stress distribution round an infinite row of circular holes in an orthotropic plate
[PB83-147157] N83-27279

CARBON FIBERS
Status, trends and implications of carbon fiber material use
[PB83-147751] N83-26934

CARBON MONOXIDE
Research strategy to permit greater utilization of domestic fossil energy resources
[DE82-018339] N83-27405
Interactions of fast molecular ions traversing thin foils: The contribution from field-ionized Rydberg atoms in measurements on Convoy electrons N83-27720

CARBON STEELS
A study of the effect of interrupted quenches on a thermomechanically processed high carbon steel
[AD-A124965] N83-26996
Powder forging of compound steels, part 2
[TULEA-1982-17-PT-2] N83-27013

CARBONACEOUS MATERIALS
Molecular ingredients of heterogeneous catalysis
[DE82-018584] N83-26950

CARBOXYLIC ACIDS
Efficiency of buffered aqueous carboxylic acid solutions and organic solvents to absorb SO2 from industrial flue; solubility data from gas-liquid chromatography
[DE83-005405] N83-27510

CARBURIZING
Measurement of the carbon activity of sodium with foils consisting of Fe-20Mn and stainless steel types A304L and 316L
[BLL-RISLEY-TRANS-4719(9091.9F)] N83-26969

CARDIOVASCULAR SYSTEM
Effect of decimeter waves on functional state of cardiovascular system, some biochemical and immunological parameters of patients recovering from myocardial infarction N83-27573
Response of the cardiovascular system to vibration and combined stresses
[AD-A125225] N83-27583

CASCADE FLOW
State space models of the Nash cascade: Kinematic and diffusion waves — dynamic hydrology systems
[TULEA-1981-14] N83-27341
On the discretization of the continuous Nash-cascade — hydrological forecasting
[TULEA-1981-17] N83-27342

CATALYSIS
Molecular ingredients of heterogeneous catalysis
[DE82-018584] N83-26950
Catalytic CO2 gasification of graphite vs. coal char
[DE82-016412] N83-26959
Coal-gasification catalysis mechanisms
[DE82-013824] N83-26960

CATALYSTS
Research in energetic compounds
[AD-A124911] N83-27024
Develop and test fuel cell powered on-site integrated total energy systems. Phase 3: Full-scale power plant development
[NASA-CR-168021] N83-27345

CATALYTIC ACTIVITY
New catalysts for the indirect liquefaction of coal
[DE82-017190] N83-26971

CATHODE RAY TUBES
Manufacturing Methods and Technology (MM&T) specifications for miniature cathode ray tube
[AD-A124954] N83-27131

CATHODES
Domed-grid-cathode project phases 1 and 2
[DE82-013844] N83-27136
Lithium/SO2 cathode studies
[DE82-012777] N83-27462
Improvements in Li(Si)/FeS2 thermal battery technology
[DE82-017779] N83-27463

CAVES
Geotechnical factors and guidelines for storage of compressed air in solution-mined salt cavities
[DE82-017611] N83-27465

CAVITIES
A note on the oscillation of cavities coupled to aerodynamic flows N83-26795
Comparison of neutron and heavy-ion damage in a stable austenite
[DE82-017369] N83-27009
Propagation of creep cracks by cavitation in fine-grained materials
[DE83-005869] N83-27268
The stress distribution round an infinite row of circular holes in an orthotropic plate
[PB83-147157] N83-27279
A microprocessor-controlled bead puller for RF cavity measurements N83-27738
First results on BNL H- MEQALAC — multiple-beam electrostatic quadrupole array linear accelerator N83-27746
New formulation of the RFQ radial matching section N83-27789

CAVITY RESONATORS
The Livermore MTA Project and its influence on modern linacs N83-27725
A beam cavity interaction computer code for linacs N83-27735
ULTRAFISH: Generalization of SUPERFISH to m equal to or less than 1 N83-27749
Cavity loading associated with high-current RF linacs N83-27754
Design considerations for a developmental high power coupling loop to drive a resonant load N83-27762
Loop coupling to a Radio Frequency Quadrupole resonator (RFQ) N83-27766
A program development for SUPERFISH N83-27768

CELL CATHODES
Electrochemical studies at carbon black paste electrodes containing cupric chloride additive
[AD-A125276] N83-26942

CENSUS
The classification of LANDSAT data for the Orlando, Florida, urban fringe area
[E83-10327] N83-27311

CENTER OF MASS
Note on the elastic-scattering of low-MeV neutrons from elemental calcium
[DE82-019476] N83-27827

CENTRAL PROCESSING UNITS
S-C-R compatibility and dual task performance in two complex information processing tasks: Threat evaluation and fault diagnosis
[AD-A124340] N83-27589

CEPHEID VARIABLES
Bump masses for BL Her stars
[DE83-019564] N83-27943

CERAMIC COATINGS
Thermal-barrier coatings for utility gas turbines
[NASA-TM-85349] N83-27022

CERAMICS
Testing of felt-ceramic materials for combustor applications
[NASA-CR-168103] N83-26837
Sintering phenomena of non-oxide silicon compounds
[DE83-007332] N83-26932
Correlation of compressive stress with spalling of plasma sprayed ceramic materials
[NASA-TM-83406] N83-27016
Interaction of ceramics with molten materials during directed crystallization
[PNR-90155] N83-27030
The beneficiation of power station coal ash and its use in heavy clay ceramics
[AERE-R-10806] N83-27031
Propagation of creep cracks by cavitation in fine-grained materials
[DE83-005869] N83-27268

CESIUM
Electron emission characteristics of tungsten alloys: Mee 492 — for use in thermionic converters
[DE83-006774] N83-27006
Ion-exchange behavior of alkali metals on treated carbons
[DE83-005980] N83-27835

CHALCOGENIDES
A general approach to the testing of binary solubility systems for thermodynamic consistency. Consolidated Fuel Reprocessing Program
[DE83-007173] N83-27697

CHARACTERIZATION
Ultrasonic system characterization
[DE82-019210] N83-27804

CHARGE COUPLED DEVICES
Automatic threshold design for a bound document scanner
[AD-A125316] N83-27913

CHARGE DISTRIBUTION
Empirical stopping powers for ions in solids N83-27706

CHARGE EXCHANGE
Calculation of the equilibrium mean charge of helium ions N83-27717
Medium dependence of charge state fractions of MeV He beam N83-27718
Charge state distribution of light ions at glancing collision N83-27719
Interactions of fast molecular ions traversing thin foils: The contribution from field-ionized Rydberg atoms in measurements on Convoy electrons N83-27720

CHARGE TRANSFER
Effective charge of low-velocity nitrogen, neon and argon ions in carbon, aluminum and gold N83-27716

CHARGED PARTICLES
Spacecraft material applications: Long-term stability questions N83-26867
Fractional charge search
[DE82-018607] N83-27194
Charge States and Dynamic Screening of Swift Ions in Solids
[DE83-006799] N83-27697
Current stopping power analyses N83-27701

Energy losses to surface plasmons by charged particles N83-27713
Effective charge of low-velocity nitrogen, neon and argon ions in carbon, aluminum and gold N83-27716
Charge state distribution of light ions at glancing collision N83-27719
Interactions of fast molecular ions traversing thin foils: The contribution from field-ionized Rydberg atoms in measurements on Convoy electrons N83-27720
Ionization by fast charged particles [DE82-014849] N83-27823

CHARM (PARTICLE PHYSICS)
Hunt for the 1(1)P sub 1 bound state of charmonium [DE82-009520] N83-27829
High-energy physics at Tufts University [DE83-007503] N83-27840

CHARPY IMPACT TEST
An evaluation of the precracked Charpy test --- for nuclear reactor materials [VTT-142] N83-27275

CHEMICAL ANALYSIS
Flash pyrolysis and hydropyrolysis of biomass [DE82-015807] N83-26951
Identification and cleavage of breakable single bonds by selective oxidation, reduction, and hydrolysis [DE82-016800] N83-26957
Quantitative analysis of TATB impurities by thin layer chromatography [DE83-007094] N83-26977
Technique and applications of X-ray photoelectron spectroscopy [AERE-R-10803] N83-26988
Particle analyzing method and apparatus [NASA-CASE-NPO-15292-1] N83-27184
Some observations on the physical metallurgy of nickel alloy weld metals N83-27240
Quality assurance for environmental analytical chemistry: 1981 [DE83-007102] N83-27513
Mean excitation energies for use in Bethe's stopping-power formula N83-27703
Instrumental photon activation analysis using the linear accelerator at the Naval Postgraduate School [AD-A125003] N83-27811

CHEMICAL BONDS
Identification and cleavage of breakable single bonds by selective oxidation, reduction, and hydrolysis [DE82-016800] N83-26957
Coal-gasification catalysis mechanisms [DE82-013824] N83-26960
Investigation of the potential functions of weakly bound diatomic molecules and laser-assisted excitive Penning ionization [DE82-017259] N83-27833

CHEMICAL CLEANING
A study of solvent and aqueous cleaning of fluxes [AD-A124950] N83-26994

CHEMICAL COMPOSITION
Chromatography of coal derived oil [BLL-T5991/BG/MRA14684/82] N83-26935
Catalytic CO2 gasification of graphite vs. coal char [DE82-016412] N83-26959
A novel general purpose computer correction procedure for quantitative X-ray fluorescence analysis [LGC-1/1982] N83-26987
Assessment of the quality of bearing steel from its inclusion content [BLL-M-26906-(5828.4)] N83-26991
Role of amines in adhesion of polybutadiene to glass substrates. 4: The effect of amine structure and concentration on the strength of adhesion [AD-A121686] N83-27028
Relation of coal characteristics to liquefaction behavior. Part 2: Continuous flow reactor studies by Gulf Research and Development Co. [DE82-016938] N83-27046
Simulated heat-exchanger tubes: DOE Geothermal Test Facility, East Mesa, California [DE83-007415] N83-27391

CHEMICAL EQUILIBRIUM
Liquid-phase methanation/shift process development [DE82-015214] N83-26961

CHEMICAL EXPLOSIONS
Oblique interactions of detonation waves with explosive/metal interfaces [DE83-007119] N83-27038
Summary of ignition and growth modeling of shock initiation and delayed detonation in full-density and porous propellants [DE83-007405] N83-27041

CHEMICAL FRACTIONATION
Chromatography of coal derived oil [BLL-T5991/BG/MRA14684/82] N83-26935

CHEMICAL PROPERTIES
Radiolabelling of chemicals [DE82-017576] N83-26949
Diesel fuel oils, 1982 [DE83-006115] N83-27051
Increased automobile fuel efficiency and synthetic fuels: Alternatives for reducing oil imports. Background paper number 2: Selected technical and economic comparison of synthetic options [PB83-147363] N83-27057
Organic solvent regeneration of granular activated carbon [PB83-150201] N83-27078
Organic Air Pollutants: Setting Priorities for Long Term Research Needs [DE83-005997] N83-27507
Coordination of Physical, Chemical, and Thermodynamic Properties for Coal Conversion: Proceedings of the Oak Ridge Conference [DE83-007169] N83-27898

CHEMICAL PROPULSION
The performance and application of high speed long life LH2 hybrid bearings for reusable rocket engine turbomachinery [NASA-TM-84317] N83-26923

CHEMICAL REACTIONS
Sensitivity analysis for premixed, laminar, steady-state flames [AD-A123866] N83-26938
Molecular dynamics of chemical reactions in solution [AD-A124953] N83-26941
Research in energetic compounds [AD-A124911] N83-27024
The influence of flux composition on the chemistry and cleanliness of 2 1/4Cr-1Mo steel electroslag weld metal N83-27234
Biosolar hydrogen and oxygen production [DE82-017491] N83-27428
Photosynthetic water splitting [DE82-017315] N83-27429
Addition of devolatilization equations to SYNTHANE computerized mathematical model [DE83-006243] N83-27444
Efficiency of buffered aqueous carboxylic acid solutions and organic solvents to absorb SO2 from industrial flue; solubility data from gas-liquid chromatography [DE83-005405] N83-27510

CHEMICAL REACTORS
A new class of steels for thick-wall pressure vessels [DE83-004101] N83-26999
Welding technologies and materials for energy applications in Japan N83-27218

CHEMILUMINESCENCE
Flame optimization for the spectroscopic analysis of the chemiluminescence from lead oxide [AD-A124825] N83-26937

CHEMISORPTION
Hydrogen transport in and through niobium [DE82-017214] N83-26980
Thermal Desorption Spectroscopy (TDS) of hydrogen from niobium [DE82-012024] N83-26981

CHINA
Aeronautical Knowledge (selected articles) [AD-A123935] N83-26925
First flight test of Chinese electron rocket is successful N83-26926

CHIPS (ELECTRONICS)
Two papers on circuit extraction [AD-A125304] N83-27130

CHLORIDES
Conceptual design of the Truscott Brine Lake solar pond system. Volume 2: Utility-integrated scenario [DE83-008133] N83-27386

CHLORINE OXIDES
Is there any chlorine monoxide in the stratosphere? [NASA-TM-85026] N83-27518

CHROMIUM ALLOYS
Aging response of a welded iron-based superalloy [DE83-005856] N83-27005

CHROMIUM STEELS
Analysis of elevated-temperature tensile and creep properties of normalized and tempered 2-1/4 Cr-1 Mo steel [DE82-018160] N83-27010
Response of bainitic 2 1/4 Cr-1 Mo steel to creep-fatigue loadings at 482 deg C [DE82-017445] N83-27011

CINEMATOGRAPHY
Determining light intensity for use with intermittent or rotating prism cameras utilizing a cinematographic light-intensity translator [DE82-015414] N83-27189

CIRCUIT BOARDS
A study of solvent and aqueous cleaning of fluxes [AD-A124950] N83-26994

CIRCUIT PROTECTION
Electromagnetic pulse protective properties in transient suppressors consisting of gas discharge tubes and filters [FOA-C-30312-A3] N83-27142

CIRCUITS
Computer assistance for the design of electronic components [DE82-008920] N83-27138
Measurement of model inter-digital H type linac N83-27786

CIRCULAR CYLINDERS
Computation of incompressible potential flow over an airfoil using a high order aerodynamic panel method based on circular arc panels [AD-A124896] N83-26825

CIRCULATORS (PHASE SHIFT CIRCUITS)
ULTRAFISH: Generalization of SUPERFISH to m equal to or less than 1 N83-27749

CITIES
Demonstration of an a-c utility connected wind generator in a urban setting [DE83-006696] N83-27387
Putting renewable energy to work in cities [DE82-017237] N83-27472
Urban-waste program research and development 1978-1981: An overview [DE82-019788] N83-27514
A mathematical model of the urban boundary layer --- atmospheric models [TULEA-1982-09] N83-27515

CITRIC ACID
Efficiency of buffered aqueous carboxylic acid solutions and organic solvents to absorb SO2 from industrial flue; solubility data from gas-liquid chromatography [DE83-005405] N83-27510

CLADDING
Processes quality assurance and examination of weld metal overlays N83-27220
Hardfacing materials and processes for valve applications N83-27221

CLAMPS
An experimental analysis in modern modal control [AD-A124839] N83-26908

CLASSIFICATIONS
Mapping of land use and geomorphology in the APAPORE project area by LANDSAT satellite data, volume 2 [E83-10333] N83-27281
Mapping of land use and geomorphology in the APAPORE project area by LANDSAT satellite data, volume 3 [E83-10334] N83-27282
Parallel processing implementations of a contextual classifier for multispectral remote sensing data [E83-10273] N83-27285
Wildland inventory and resource modeling for Douglas and Carson City Counties, Nevada, using LANDSAT and digital terrain data [E83-10302] N83-27293
Improved version of the split routine for CLASSY [E83-10308] N83-27298
Assembly language coding for CLASSY [E83-10309] N83-27299
A nonparametric clustering technique which estimates the number of clusters [E83-10310] N83-27300
Effects of autocorrelation upon LANDSAT classification accuracy --- Richmond, Virginia and Denver, Colorado [E83-10328] N83-27312
Mapping of land use and geomorphology in the APAPORE project area by LANDSAT satellite data, volume 1 [E83-10332] N83-27314
Human information processing guidelines for decision-aiding displays [AD-A124858] N83-27599

CLAYS
The beneficiation of power station coal ash and its use in heavy clay ceramics [AERE-R-10806] N83-27031

CLEANING
Acid rain: Control strategies for coal-fired utility boilers, volume 1 [DE83-006695] N83-27511

CLEAR AIR TURBULENCE
Aircraft accident report: IBEX Corporation Gates Learjet 23, N100TA, Atlanta, near Savannah, Georgia, 6 May 1982 [PB83-910401] N83-26827

CLIMATE
The sensitivity of numerically simulated climates to land-surface boundary conditions [NASA-TM-83985] N83-27536
Terminal forecast reference notebook for Rhein Main AB, Germany [AD-A124984] N83-27547

Terminal forecast reference notebook for Grafenwoehr AAF, Germany
[AD-A125038] N83-27549

CLIMATOLOGY
Revised Uniform Summary of Surface Weather Observations (RUSSWO)
[AD-A122719] N83-27543

CLINICAL MEDICINE
USSR report: Life sciences. Effects of nonionizing electromagnetic radiation, no. 9
[JPRS-83601] N83-27572

CLOSED CIRCUIT TELEVISION
Simulated monitor display for CCTV
[DE82-017020] N83-27552

CLOUD COVER
Beer's-law-based, simple spectral model for direct normal and diffuse horizontal irradiance
[DE83-008132] N83-27526

CLUSTER ANALYSIS
A nonparametric clustering technique which estimates the number of clusters
[E83-10310] N83-27300

CMOS
Error analysis and prevention of cosmic ion-induced soft errors in static CMOS RAMS
[DE82-018987] N83-27610

COAL
Proceedings of the 4th International Symposion on Coal-Slurry Combustion, volume 1
[DE82-016335] N83-26944
H2S removal from coal gas at mid temperature (150 to 200 deg C)
[DE82-011004] N83-26963
Fluidised-bed combustion. Initial results obtained in a 1-ft by 1-ft fluidised-bed combustor operating at pressures up to 20 ATM
[DE83-005956] N83-26974
Proceedings of the Fourth International Symposium on Coal-Slurry Combustion, volume 3 --- conferences
[DE82-016351] N83-26982
Proceedings of the Fourth International Symposium on Coal-Slurry Combustion, volume 4
[DE82-016336] N83-26983
The beneficiation of power station coal ash and its use in heavy clay ceramics
[AERE-R-10806] N83-27031
Pneumatic conveying of coal and coal-limestone mixtures as applied to atmospheric fluidized-bed combustion
[DE82-015694] N83-27243
Sulfur control in fluidized-bed combustors: Methodology for predicting the performance of limestone and dolomite sorbents. Addendum. Compilation of sorbent performance data from atmospheric fluidized-bed combustors
[DE83-007659] N83-27501
Calculation of calorific value of coal/char from its ultimate analysis
[DE82-012879] N83-27899

COAL DERIVED LIQUIDS
Chromatography of coal derived oil
[BLL-T5991/BG/MRA14684/82] N83-26935

COAL GASIFICATION
Analysis of a failed spent-char transfer line from the IGT HYGAS coal-gasification pilot plant
[DE82-014906] N83-26947
Catalytic CO2 gasification of graphite vs. coal char
[DE82-016412] N83-26959
Coal-gasification catalysis mechanisms
[DE82-013824] N83-26960
Dew points of hot gases from coal-gasification processes
[DE82-016337] N83-26964
Gasification in pulverized coal flames. Investigation of pulverized coal-combustors and gasifiers: Multiple sub-reactor model and experimental results, part 2
[DE82-013001] N83-26965
Prediction and measurement of optimum operating conditions for entrained coal-gasification processes
[DE82-015612] N83-26972
Mass flow measurement of solids/gas stream using radiometric techniques
[DE82-017028] N83-27170
High-temperature turbine-technology program. Phase 2: Technology test and support studies. Design and development of a regeneratively fuel cooled high temperature gas turbine combustor for operation on low Btu gas
[DE83-007342] N83-27241
Kinetic mechanism for fuel-nitrogen conversion in lean to rich flames
[DE82-905467] N83-27356
Addition of devolatilization equations to SYNTHANE computerized mathematical model
[DE83-006243] N83-27444
Laboratory tests at elevated pressures of a silane igniter system for in-situ coal gasification
[DE83-007217] N83-27450
Pacific Northwest Laboratory report to the DOE Office of Energy Research. Part 2: Environmental sciences
[DE83-007586] N83-27481

COAL LIQUEFACTION
Identification and cleavage of breakable single bonds by selective oxidation, reduction, and hydrolysis
[DE82-016800] N83-26957
Solvent Refined Coal (SRC) process. Corrosion-erosion study
[DE82-011499] N83-26966
New catalysts for the indirect liquefaction of coal
[DE82-017190] N83-26971
Relation of coal characteristics to liquefaction behavior. Part 2: Continuous flow reactor studies by Gulf Research and Development Co.
[DE82-016938] N83-27046
Further studies on developing technology for indirect liquefaction
[DE82-017677] N83-27406
Implications of emerging environmental-control technologies for air-pollution regulations
[DE83-005901] N83-27508
Coordination of Physical, Chemical, and Thermodynamic Properties for Coal Conversion: Proceedings of the Oak Ridge Conference
[DE83-007169] N83-27898

COAL UTILIZATION
Increased automobile fuel efficiency and synthetic fuels: Alternatives for reducing oil imports. Background paper number 2: Selected technical and economic comparison of synthetic options
[PB83-147363] N83-27057

COARSENESS
Aging response of a welded iron-based superalloy
[DE83-005856] N83-27005

COASTAL WATER
Marine research N83-27483
Prediction of nearshore wave transformation
[AD-A125104] N83-27561

COATING
Continuous coating of indium tin oxide onto large area flexible substrates N83-27370

COATINGS
Passive films, surface structure and stress corrosion and crevice corrosion susceptibility
[AD-A124879] N83-26995
Continuous cable processing by the physical vapor deposition technique
[DE83-006011] N83-27003
RF sputtered silicon and hafnium nitrides: Properties and adhesion to 440C stainless steel
[NASA-TM-83400] N83-27020
Vacuum roll coating equipment N83-27369
Low-cost, sprayed CdTe solar-cell research
[DE83-007275] N83-27392
Solar-assisted water-source heat pump
[DE83-006023] N83-27457

COAXIAL FLOW
Coaxial dump combustor investigations N83-26791

COAXIAL PLASMA ACCELERATORS
Low frequency RFQ linacs for heavy ion fusion N83-27767

COBALT COMPOUNDS
Design of REC permanent magnet quadrupoles taking into account B, H non-linearity N83-27770

COBOL
Micro Focus Ltd., INTEL MDS 231 (8080A), CIS COBOL V. 4.5 Rev 1 (COBOL technical report)
[PB83-155788] N83-27612
Micro Focus Ltd., INTEL series 2, level 2 COBOL V.2.2
[PB83-147603] N83-27632

CODE DIVISION MULTIPLEXING
Design of an additive scrambler for parallel connection with numerical multiplexers at 565 Mb/sec --- data transmission
[FUB-22-1982] N83-27121
Statistical properties of the sequences produced by additive scramblers --- data transmission
[FUB-23-1982] N83-27122

CODES
ARIS: Acid Rain Information System
[DE83-007026] N83-27512

CODING
Buncher section optimization of heavy ion RFQ linacs N83-27790
Gamma-ray for simultaneous calorimetric assay
[DE82-008615] N83-27826
Preliminary calculations for testing a fission/fusion hybrid blandket module in a fission reactor: Addendum 2
[DE82-015622] N83-27860

COEFFICIENTS
Differentiation and generation of Taylor coefficients in PASCAL-SC
[AD-A125246] N83-27655

COGENERATION
Develop and test fuel cell powered on-site integrated total energy system
[NASA-CR-168021] N83-27348
Economic evaluation of end-user conservation measures applied to buildings served by a proposed district-heating system
[DE82-016080] N83-27470

COGNITION
A model for human visual processing which explains perceptions of motion-after-effects
[AD-A124842] N83-27588
Knowledge and skill differences in novices and experts
[AD-A124466] N83-27592
Validation of brain event-related potentials as indicators of cognitive styles, abilities, and aptitudes
[AD-A125292] N83-27593

COHERENT SCATTERING
Beer's-law-based, simple spectral model for direct normal and diffuse horizontal irradiance
[DE83-008132] N83-27526

COKE
Catalytic CO2 gasification of graphite vs. coal char
[DE82-016412] N83-26959

COLD WORKING
Solvent Refined Coal (SRC) process. Corrosion-erosion study
[DE82-011499] N83-26966

COLLAPSE
Analysis of progressive collapse of complex structures
[AD-A125266] N83-27260

COLLISION PARAMETERS
Diffractive interactions of hadrons at high energies
[DE82-019463] N83-27830

COLLISIONS
Perturbed stationary-state description of the polarization effect in innershell ionization N83-27705
Calculation of the equilibrium mean charge of helium ions N83-27717
Medium dependence of charge state fractions of MeV He beam N83-27718
Charge state distribution of light ions at glancing collision N83-27719
Interactions of fast molecular ions traversing thin foils: The contribution from field-ionized Rydberg atoms in measurements on Convoy electrons N83-27720
Interaction of hydrogen molecular ions with thin foils. Part 2: Balmer emission N83-27722
Interaction of hydrogen molecular ions with thin foils. Part 3: Inner-shell ionization N83-27723

COLLOCATION
On the numerical solution of some 2-D electromagnetic interface problems by the boundary collocation method
[AD-A125269] N83-27666

COLOR
Diesel fuel oils, 1982
[DE83-006115] N83-27051
Selecting band combinations with thematic mapper data
[E83-10303] N83-27294

COLORADO
Sedimentology of the Mesaverde formation of Rifle Gap, Colorado and implications for gas-bearing intervals in the subsurface
[DE82-013396] N83-27530

COLUMNS (PROCESS ENGINEERING)
Dew points of hot gases from coal-gasification processes
[DE82-016337] N83-26964

COLUMNS (SUPPORTS)
Hoop/column antenna development program N83-26874
Moment-rotation characteristics of semi-rigid steel beam-column connections
[PB83-145318] N83-27081
Stability of an impact-loaded elastic column with two degrees of freedom
[TULEA-1981-05-T] N83-27270
Influence of damping on the transverse displacement of an impact-loaded column with two degrees of freedom
[TULEA-1981-06-T] N83-27271

COMBINED CYCLE POWER GENERATION
H2S removal from coal gas at mid temperature (150 to 200 deg C)
[DE82-011004] N83-26963
High-Temperature-Turbine-Technology Program. Phase 2: Technology test and support studies. Design and development of a high temperature low emissions combustor for stationary gas turbines
[DE83-005895] N83-27246

Heber Binary Project. Binary Cycle Geothermal Demonstration Power Plant (RP1900-1) N83-27375

COMBUSTION

Proceedings of the 4th International Symposion on Coal-Slurry Combustion, volume 1 [DE82-016335] N83-26944

Analysis of flame propagation [DE82-016582] N83-26948

Pulverized fuel and scaleup methodologies [DE82-014822] N83-26962

Injection, atomization, ignition and combustion of liquid fuels in high-speed air streams [AD-A125237] N83-27033

High-temperature turbine-technology program. Phase 2: Technology test and support studies. Design and development of a regeneratively fuel cooled high temperature gas turbine combustor for operation on low Btu gas [DE83-007342] N83-27241

Combustion losses in automotive spark ignition and diesel engines [DE83-006015] N83-27244

International energy technology assessment: Atmospheric fluidized-bed combustion [DE82-012430] N83-27404

Downhole steam-generator study. Volume 1: Conception and feasibility evaluation [DE82-018348] N83-27424

Laboratory tests at elevated pressures of a silane igniter system for in-situ coal gasification [DE83-007217] N83-27450

COMBUSTION CHAMBERS

Coaxial dump combustor investigations N83-26791

Testing of felt-ceramic materials for combustor applications [NASA-CR-168103] N83-26837

Verification studies of entrained-flow gasification and combustion systems with the SIMMER-II code [DE82-012148] N83-26978

High-temperature turbine-technology program. Phase 2: Technology test and support studies. Design and development of a regeneratively fuel cooled high temperature gas turbine combustor for operation on low Btu gas [DE83-007342] N83-27241

Assessment of water addition to spark ignition engines [DE83-006013] N83-27245

High-Temperature-Turbine-Technology Program. Phase 2: Technology test and support studies. Design and development of a high temperature low emissions combustor for stationary gas turbines [DE83-005895] N83-27246

Effects of core nonuniformities on the performance of MHD generators [DE83-005426] N83-27447

Incinerator development program for processing transuranic waste at the Idaho National Engineering Laboratory [DE82-017265] N83-27839

COMBUSTION EFFICIENCY

Fluidised-bed combustion. Initial results obtained in a 1-ft by 1-ft fluidised-bed combustor operating at pressures up to 20 ATM [DE83-005956] N83-26974

Increased automobile fuel efficiency and synthetic fuels: Alternatives for reducing oil imports. Background paper number 2: Selected technical and economic comparison of synthetic options [PB83-147363] N83-27057

COMBUSTION PHYSICS

Application of numerical simulation methodology to automotive combustion [DE82-015912] N83-27247

COMBUSTION PRODUCTS

Synthetic-fuel combustion: Pollutant formation. Soot-initiation mechanisms in burning aromatics [DE83-005611] N83-26945

Kinetic mechanism for fuel-nitrogen conversion in lean to rich flames [DE82-905467] N83-27356

Effects of core nonuniformities on the performance of MHD generators [DE83-005426] N83-27447

Sulfur control in fluidized-bed combustors: Methodology for predicting the performance of limestone and dolomite sorbents. Addendum. Compilation of sorbent performance data from atmospheric fluidized-bed combustors [DE83-007659] N83-27501

Fluidized-bed combustion: A review of environmental aspects [DE82-021238] N83-27506

COMBUSTION STABILITY

A calculation of wrinkled flames [AD-A125258] N83-26943

COMETS

Conference on Planetary Volatiles [NASA-CR-172682] N83-27938

COMMAND AND CONTROL

Modeling human decision processes in command and control [AD-A125218] N83-27595

COMMERCIAL ENERGY

Conducted and radiated signatures of fluorescent lamp systems in C and I environments N83-27106

COMMUNICATING

Concepts for a Standard Data Interchange Structure (SDIS) INPE proposal to CCSDS/Panel 3 [INPE-2724-PRE/308] N83-27087

COMMUNICATION NETWORKS

Concepts for connectivity and interoperability of world space data networks: INPE proposal to CCSDS/Panel 3 [INPE-2722-PRE/307] N83-27088

A model for forecasting the country's general use data transmission network [AD-A124847] N83-27095

Automatic generation of adequate graphs with given connectivity conditions [FUB-20-1982] N83-27119

COMMUNICATION THEORY

Communications today (selected articles) [AD-A124795] N83-27096

COMMUNITIES

Energy future Santa Cruz: A citizens' plan for energy self-reliance [PB83-136960] N83-27475

COMPACTING

Figure-of-merit analysis and cost effectiveness of low-level radioactive waste treatment systems [DE82-018890] N83-27838

COMPATIBILITY

S-C-R compatibility and dual task performance in two complex information processing tasks: Threat evaluation and fault diagnosis [AD-A124340] N83-27589

COMPILERS

Micro Focus Ltd., INTEL MDS 231 (8080A), CIS COBOL V. 4.5 Rev 1 (COBOL technical report) [PB83-155788] N83-27612

Micro Focus Ltd., INTEL series 2, level 2 COBOL V.2.2 [PB83-147603] N83-27632

COMPONENT RELIABILITY

Shock-wave response of titanium sunhydride-potassium perchlorate [DE82-016739] N83-27043

COMPOSITE MATERIALS

Spacecraft materials research: A NASA perspective N83-26866

Spacecraft material applications: Long-term stability questions N83-26867

Transient heat flow along uni-directional fibers in composites [AD-A122926] N83-26929

Nondestructive inspection and evaluation of composite-material flywheels [DE82-015379] N83-26930

Potential of composite materials in surface transportation applications [DE83-007218] N83-26931

Status, trends and implications of carbon fiber material use [PB83-147751] N83-26934

Stability of laminated composite shells subjected to uniform axial compression and torsion [AD-A125204] N83-27262

Bending of laminated anisotropic shells by a shear deformable finite element [PB83-145409] N83-27278

COMPOSITE STRUCTURES

Spacecraft materials research: A NASA perspective N83-26866

The simulation of a passive solar energy system [AD-A124900] N83-27354

COMPRESSED AIR

Hydraulic air compressor as part of an ultra low-head hydropower system [DE82-018428] N83-27425

Geotechnical factors and guidelines for storage of compressed air in solution-mined salt cavities [DE82-017611] N83-27465

COMPRESSIBILITY EFFECTS

The energy balance in axisymmetric steady compressible swirl flows with closed streamlines N83-26789

Compound-compressible nozzle flow N83-26790

Summary of ignition and growth modeling of shock initiation and delayed detonation in full-density and porous propellants [DE83-007405] N83-27041

COMPRESSIBLE FLOW

Implicit upwind methods for the compressible Navier-Stokes equations [NASA-TM-84364] N83-27149

COMPRESSIBLE FLUIDS

Mixing of compressible fluid with application to ejector thrusters N83-26803

COMPRESSION TESTS

Compression and compression fatigue testing of composite laminates [NASA-CR-166023] N83-26928

Stability of laminated composite shells subjected to uniform axial compression and torsion [AD-A125204] N83-27262

COMPRESSOR BLADES

Revision of the shock loss re-estimation procedure of Program UDO300 utilizing a three-dimensional shock model [AD-A124928] N83-27154

COMPRESSORS

Load leveling on industrial refrigeration systems [DE82-902079] N83-27066

Optimized two-capacity advanced electric heat pump [DE82-017447] N83-27173

Hydraulic air compressor as part of an ultra low-head hydropower system [DE82-018428] N83-27425

Investigation of the coupling of unsteady lift to low order acoustic duct modes in an axial flow fan [AD-A124819] N83-27798

Index encoding: A compression technique for large statistical databases [DE83-006431] N83-27917

COMPUTATION

Texture functions in image analysis: A computationally efficient solution [NASA-TM-85022] N83-27326

Differentiation and generation of Taylor coefficients in PASCAL-SC [AD-A125246] N83-27655

COMPUTATIONAL FLUID DYNAMICS

A collection of papers in the aerospace sciences [AD-A122667] N83-26787

Computational fluid dynamics: An engineering tool? N83-26796

MARIAH: A finite-element computer program for incompressible porous-flow problems, user's manual [DE83-006847] N83-27167

Calculation of turbulence-driven secondary motion in noncircular ducts [KU-SFB-80/T/220] N83-27178

Turbulence models; a lecture course [CFD/82/4-REV] N83-27180

Application of a new version of the k-W model of turbulence to equilibrium boundary layer flow over a flat plate with: (1) intense heat transfer and (2) streamwise adverse pressure gradients [CFD/82/14] N83-27181

Application of a new version of the k-W model of turbulence to a boundary layer with mass transfer [CFD/82/15] N83-27182

Calculation of the unsteady flow through relatively moving blade rows and the unsteady blade forces [PNR-90158] N83-27183

COMPUTER AIDED DESIGN

A collection of papers in the aerospace sciences [AD-A122667] N83-26787

Statistical experimental designs in computer aided optimal aircraft design N83-26812

General mechanism analysis package [DE82-008158] N83-27060

Automatic generation of adequate graphs with given connectivity conditions [FUB-20-1982] N83-27119

Test networks defined by an average rank and a planarity index — telecommunication networks, graph theory [FUB-31-1982] N83-27124

Two papers on circuit extraction [AD-A125304] N83-27130

Sandia Micro Generation for Integrated Circuits (SMAGIC) system and the hierarchical artwork (HAT) language [DE82-009912] N83-27134

Computer assistance for the design of electronic components [DE82-008920] N83-27138

Revision of the shock loss re-estimation procedure of Program UDO300 utilizing a three-dimensional shock model [AD-A124928] N83-27154

Optimized two-capacity advanced electric heat pump [DE82-017447] N83-27173

Potential of minicomputer/array-processor system for nonlinear finite-element analysis [NASA-TM-84566] N83-27259

Matching based interactive facility layout
[AD-A124958] N83-27609
Development of a design automation graphics work station
[AD-A124824] N83-27618
Hand-held computer programs for preliminary helicopter design
[AD-A125036] N83-27624
COMPUTER DESIGN
Design of a prototype universal network interface device using INTEL 8086 and 8089 16-bit microprocessors
[AD-A124834] N83-27606
COMPUTER GRAPHICS
General mechanism analysis package
[DE82-008158] N83-27060
Sandia Micro Generation for Integrated Circuits (SMAGIC) system and the hierarchical artwork (HAT) language
[DE82-009912] N83-27134
Simulated monitor display for CCTV
[DE82-017020] N83-27552
Matching based interactive facility layout
[AD-A124958] N83-27609
Development of a design automation graphics work station
[AD-A124824] N83-27618
The EZDRAW: An interactive computer graphics program to design bar, line or pie graphs
[AD-A124901] N83-27620
Program visualization
[AD-A125291] N83-27621
COMPUTER INFORMATION SECURITY
A secure computer network
[AD-A124820] N83-27634
COMPUTER NETWORKS
Communications today (selected articles)
[AD-A124795] N83-27096
Design of a prototype universal network interface device using INTEL 8086 and 8089 16-bit microprocessors
[AD-A124834] N83-27606
Networking DEC and IBM computers
[NASA-TM-85019] N83-27633
A secure computer network
[AD-A124820] N83-27634
Bringing a large computer network into FOCUS
[DE82-010412] N83-27635
Protocol translation and translators for heterogeneous computer networks
[DE83-007379] N83-27636
A new approach for solving simultaneous resource possession problems in closed queueing networks
[AD-A124877] N83-27637
Design of a distributed data base management system for use in the AFIT Digital Engineering Laboratory
[AD-A124821] N83-27905
A backend data base system for the Eglin computer network
[AD-A124908] N83-27911
COMPUTER PROGRAMMING
Mean wave drift forces: Theory and experiment — water waves
[NMI-R-124] N83-27146
Program visualization
[AD-A125291] N83-27621
NIGEL: A systemic grammar for text generation
[AD-A125253] N83-27622
An interactive and automated software development environment
[AD-A124872] N83-27623
Problem solving techniques for the design of algorithms
[AD-A125211] N83-27643
COMPUTER PROGRAMS
Compound-compressible nozzle flow N83-26790
Programs for the transonic wind tunnel data processing installation. Part 10: Six component measurements updated
[AD-A122248] N83-26824
Dynamic characteristics of aerial refueling systems
[AD-A124770] N83-26830
Systems design and comparative analysis of large antenna concepts N83-26863
Dew points of hot gases from coal-gasification processes
[DE82-016337] N83-26964
Gasification in pulverized coal flames. Investigation of pulverized coal-combustors and gasifiers: Multiple sub-reactor model and experimental results, part 2
[DE82-013001] N83-26965
Assessment of the quality of bearing steel from its inclusion content
[BLL-M-26906-(5828.4)] N83-26991
Relation of coal characteristics to liquefaction behavior. Part 2: Continuous flow reactor studies by Gulf Research and Development Co.
[DE82-016938] N83-27046
Jet penetration of inerts and explosives
[DE83-003746] N83-27052
Engineering and manufacture of a high-efficiency, automatic defrosting refrigerator-freezer
[DE82-017480] N83-27065
Joint opening nonlinear mechanism: Interface smeared crack model
[PB83-149195] N83-27084
Handbook of thermal insulation applications
[AD-A125264] N83-27158
MARIAH: A finite-element computer program for incompressible porous-flow problems, user's manual
[DE83-006847] N83-27167
The welding metallurgy of SA508 C1 II heat affected zones N83-27230
Combustion losses in automotive spark ignition and diesel engines
[DE83-006015] N83-27244
A comparison of two methods for calculating wave drift forces — water waves, offshore structures
[NMI-R-137] N83-27255
LANDSAT-D flight segment operations manual. Appendix B: OBC software operations
[E83-10288] N83-27290
Improved version of the split routine for CLASSY
[E83-10308] N83-27298
Assembly language coding for CLASSY
[E83-10309] N83-27299
METCOR4: A program to simulate METSAT data
[E83-10313] N83-27302
A computer program for the simulation of heat and moisture flow in soils
[E83-10342] N83-27317
Test results and description of a 1-kW free-piston Stirling engine with a dashpot load
[NASA-TM-83407] N83-27346
Computer-aided analysis of energy consumption in ethanol-water distillation operations
[DE82-014333] N83-27413
DRAC: A user-friendly computer code for modeling transient thermohydraulic phenomena in solar-receiver tubing
[DE83-007091] N83-27458
ARIS: Acid Rain Information System
[DE83-007026] N83-27512
Prediction of nearshore wave transformation
[AD-A125104] N83-27561
Computer simulation of a multiaxis air-to-air tracking task using the optimal pilot control model
[AD-A125302] N83-27597
FORTRAN based linear programming for microcomputers
[AD-A124804] N83-27605
The use of the Blake computer program to calculate thermodynamic properties of Australian-made gun propellants
[AD-A118605] N83-27615
Efficiency considerations for C programs on a VAX (trademark) 11/780
[AD-A125209] N83-27617
Development of computer performance evaluation tools for VAX-11/780 computers
[AD-A124904] N83-27619
The EZDRAW: An interactive computer graphics program to design bar, line or pie graphs
[AD-A124901] N83-27620
Hand-held computer programs for preliminary helicopter design
[AD-A125036] N83-27624
New FORTRAN computer programs to acquire and process isotropic mass-spectrometric data
[DE82-019901] N83-27629
Differentiation and generation of Taylor coefficients in PASCAL-SC
[AD-A125246] N83-27655
Recent developments in algorithms and software for trust-region methods
[DE83-006276] N83-27667
STOP: A fast method of disjointing binary product sets
[DE83-007463] N83-27670
ULTRAFISH: Generalization of SUPERFISH to m equal to or less than 1 N83-27749
MOTION: A versatile multiparticle simulation code N83-27758
A program development for SUPERFISH N83-27768
A modular system for the control of complex accelerators using portable software N83-27781
Buncher section optimization of heavy ion RFQ linacs N83-27790
Gamma-ray for simultaneous calorimetric assay
[DE82-008615] N83-27826
Recent results on the dense Z-pinch
[DE82-015802] N83-27859
Preliminary calculations for testing a fission/fusion hybrid blanket module in a fission reactor: Addendum 2
[DE82-015622] N83-27860
Research support for plasma diagnostic on Elmo Bumpy Torus. Observations of EBT ring geometry by means of diamagnetic field measurements using a compensated ferromagnetic resonance magnetometer, and a preliminary numerical study of EBT flux penetration dynamics
[DE83-007883] N83-27864
A general approach to the testing of binary solubility systems for thermodynamic consistency. Consolidated Fuel Repr -cessing Program
[DE83-007173] N83-27897
The performance measurement of a relational database system using monitoring and modeling techniques
[AD-A124919] N83-27910
COMPUTER SYSTEMS DESIGN
Papers on techniques of program design
[ISSN-0208-5658] N83-27613
A secure computer network
[AD-A124820] N83-27634
Methodology for view integration in logical database design
[DE83-005754] N83-27918
COMPUTER SYSTEMS PERFORMANCE
A study of multivariate statistical analysis techniques for computer performance evaluation
[AD-A124899] N83-27681
COMPUTER SYSTEMS PROGRAMS
DPSNA-1: A simulation model for queueing networks with limited capacity and repetition of service demand calls — packet switching networks
[FUB-19-1982] N83-27118
Use of the C language pre-processor in the RT-11 FORTRAN environment
[DE82-010076] N83-27626
COMPUTER TECHNIQUES
Production planning, production systems for flexible automation
[PNR-90150] N83-27067
Communications today (selected articles)
[AD-A124795] N83-27096
Engineering Research Division publication report, calendar year 1981 — bibliography
[DE82-016086] N83-27265
A visit to the Computer Science Department
[AD-A124855] N83-27607
Probabilistic design using numerical optimization
[AD-A125232] N83-27651
Computerized measurement and tracking of acoustical resonances
[AD-A125286] N83-27799
COMPUTER VISION
Quaternions in computer vision and robotics
[AD-A125876] N83-27600
COMPUTERIZED SIMULATION
Dynamic characteristics of aerial refueling systems
[AD-A124770] N83-26830
Simulation program of rotary wings
[FOA-C-30308-E1] N83-26836
An experimental analysis in modern modal control
[AD-A124839] N83-26908
General mechanism analysis package
[DE82-008158] N83-27060
Engineering and manufacture of a high-efficiency, automatic defrosting refrigerator-freezer
[DE82-017480] N83-27065
Prediction of the seismic responses of R/C frame-coupled wall structures
[PB83-149203] N83-27083
Performance of sequentially decoded long constraint length codes for a satellite communications link in a scintillated channel
[AD-A124814] N83-27093
The welding metallurgy of SA508 C1 II heat affected zones N83-27230
METCOR4: A program to simulate METSAT data
[E83-10313] N83-27302
A computer program for the simulation of heat and moisture flow in soils
[E83-10342] N83-27317
Analysis, design, fabrication, and testing of moderately concentrating solar-energy collectors
[DE83-006065] N83-27445
A mathematical model of the urban boundary layer — atmospheric models
[TULEA-1982-09] N83-27515
Numerical simulation of the influence of small scale mountain ranges on a baroclinic wave
[AD-A125301] N83-27546
Computer simulation of a multiaxis air-to-air tracking task using the optimal pilot control model
[AD-A125302] N83-27597
Computer simulation of geometrical effects on the stopping power for 7 MeV protons N83-27700

Computer simulation of longitudinal-transverse space charge effects in bunched beams N83-27751
MOTION: A versatile multiparticle simulation code N83-27758
Application of computer modeling to the study of the thermodynamic forces acting on a building [AD-A125227] N83-27894

COMPUTERS
Development of a query processor for a back-end multiprocessor relational database computer [AD-A124885] N83-27907

CONCENTRATION (COMPOSITION)
Quantitative analysis of phosphosilicate glass films on silicon wafers [DE82-017642] N83-26953
Quantitative analysis of TATB impurities by thin layer chromatography [DE83-007094] N83-26977
A novel general purpose computer correction procedure for quantitative X-ray fluorescence analysis [LGC-1/1982] N83-26987
Measurement of the carbon activity of sodium with foils consisting of Fe-20Mn and stainless steel types A304L and 316L [BLL-RISLEY-TRANS-4719(9091.9F)] N83-26989
Dynamic powder compaction of rapidly solidified Path A alloy with increased carbon and titanium content [DE82-017252] N83-27008
Diesel fuel oils, 1982 [DE83-006115] N83-27051
Measurement of the thermodynamic quantities for the AG-S system by the EMF method [NRC/CNR-TT-2062] N83-27892

CONCRETES
Concrete construction using slipform techniques [AD-A124923] N83-27059
Papers on techniques of program design [ISSN-0208-5658] N83-27613

CONDITIONS
Periodic renewal theory [CTH-MATH-1983-5] N83-27675

CONDUCTIVE HEAT TRANSFER
A comparison of the finite heat conduction equation with temperature dependent conductivity [AD-A124918] N83-27647
Application of computer modeling to the study of the thermodynamic forces acting on a building [AD-A125227] N83-27894

CONFERENCES
Large Space Antenna Systems Technology, part 1 [NASA-CP-2269-PT-1] N83-26853
Large Space Antenna Systems Technology, part 2 [NASA-CP-2269-PT-2] N83-26879
Proceedings of the Fourth International Symposium on Coal-Slurry Combustion, volume 3 --- conferences [DE82-016351] N83-26982
Proceedings of the Fourth International Symposium on Coal-Slurry Combustion, volume 4 [DE82-016336] N83-26983
International Conference on Welding Technology for Energy Applications [DE83-006404] N83-27215
Deep-source-gas workshop technical proceedings [DE83-005003] N83-27339
Proceedings of the Sixth Annual Geothermal Conference and Workshop [DE83-901135] N83-27372
Survival; motivation; preparation [FOA-C-54045-H1] N83-27596
Proceedings of the 1981 Linear Accelerator Conference [DE82-013754] N83-27724
Coordination of Physical, Chemical, and Thermodynamic Properties for Coal Conversion: Proceedings of the Oak Ridge Conference [DE83-007169] N83-27898
NASA/Goddard Space Flight Center contributions to the Workshop on Positron-Electron Pairs in Astrophysics [NASA-TM-85027] N83-27928
Conference on Planetary Volatiles [NASA-CR-172682] N83-27938
Large Deployable Reflector Science and Technology Workshop. Volume 2: Scientific Rationale and Technology Requirements [NASA-CP-2275] N83-27939

CONFIDENCE LIMITS
MTBF confidence bounds based on MIL-STD-781C fixed-length test results N83-26813
Estimating survival probability or reliability: Simulation assessments of the Delta method, Jacknife and bootstrap [AD-A125000] N83-27249

CONFINING
Effect of confining pressure on pore volume in tight sandstones [DE82-013573] N83-27524

CONGRESSIONAL REPORTS
Small computers in the federal government: Management is needed to realize potential and prevent problems [GAO/AFMD-83-36] N83-27604
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984 N83-27919
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984: National Aeronautics and Space Administration N83-27920
NASA authorization for fiscal year 1984 [GPO-19-200] N83-27921

CONICAL BODIES
Experimental investigation of a mechanical impedance gauge based on measurement of strains on a conical rod [TULEA-1981-66-T] N83-27272

CONIFERS
Detection of aspen/conifer forest mixes from multitemporal LANDSAT digital data --- Bear River Range, Rocky Mountains [E83-10324] N83-27309

CONNECTICUT
Geology and mineral resources of the Providence 1 deg by 2 deg NTMS quadrangle, Connecticut-Massachusetts-Rhode Island N83-27331

CONSERVATION EQUATIONS
Pulverized fuel and scaleup methodologies [DE82-014822] N83-26962

CONSERVATION LAWS
Linearized stability of extreme shock profiles for systems of conservation laws with viscosity [AD-A125256] N83-27159

CONSTRAINTS
Motion estimation based on multiple local constraints and nonlinear smoothing [AD-A124838] N83-27640

CONSTRUCTION
Advances in structural concepts N83-26868
Concrete construction using slipform techniques [AD-A124923] N83-27059
Phase-change materials in masonry construction [DE83-007227] N83-27061
Field experiences underscore the importance of moisture control in energy-efficient homes [DE83-901234] N83-27064
Small hydroelectric power plant for Aztec, New Mexico [DE82-903957] N83-27432
Review of induction linacs N83-27769

CONSTRUCTION MATERIALS
Handbook of thermal insulation applications [AD-A125264] N83-27158

CONTAMINANTS
Particle resuspension and translocation N83-27496

CONTEXT
Parallel processing implementations of a contextual classifier for multispectral remote sensing data [E83-10273] N83-27285

CONTINUITY
Using pyramids to detect good continuation [AD-A124848] N83-27616

CONTINUOUS RADIATION
Traveling-wave tube amplifier characteristics study for stochastic beam-cooling experiments [DE83-005867] N83-27132
Proceedings of the 1981 Linear Accelerator Conference [DE82-013754] N83-27724
Low energy 100 percent duty factor Alvarez linacs at Chalk River N83-27726
Operating experience with MAMI 1 N83-27729

CONTINUOUS SPECTRA
Gamma-gun in the center of the galaxy [REPT-757] N83-27945

CONTINUUM MECHANICS
Fundamental study of dense-fluid detonation [AD-A125300] N83-27156

CONTOURS
Bathymetric data and analysis for the NRL remote sensing experiment: Phelps Bank, July 1982 [AD-A125220] N83-27563
Contour-based motion estimation [AD-A124812] N83-27848
Determining velocities by propagation [AD-A124889] N83-27849

CONTROL
Field experiences underscore the importance of moisture control in energy-efficient homes [DE83-901234] N83-27064

CONTROL EQUIPMENT
Electronic system for high power load control --- solar arrays [NASA-CASE-NPO-15358-1] N83-27126
How to solve materials and design problems in solar heating and cooling, Energy Technology Review No. 77 [DE83-006116] N83-27456
Solar-assisted water-source heat pump [DE83-006023] N83-27457
Evolution of the racetrack microtron control system N83-27760

CONTROL MOMENT GYROSCOPES
Results of studies at Langley Research Center on the control of large space systems N83-26887

CONTROL THEORY
High-gain error actuated flight control systems for continuous linear multivariable plants [AD-A124871] N83-26848
Application of modern control theory for building structures [PB83-144147] N83-27080
Optimal decentralized control of finite nondeterministic systems [AD-A124940] N83-27684

CONTROLLED FUSION
End-Use Products of Fusion Energy: Alternatives and Their Implications to the Fusion Energy R and D Strategy [PB83-151696] N83-27873

CONVECTION
DRAC: A user-friendly computer code for modeling transient thermohydraulic phenomena in solar-receiver tubing [DE83-007091] N83-27458

CONVECTIVE HEAT TRANSFER
Prediction of natural convection flow pattern in low-aspect ratio enclosures [AD-A124995] N83-27161
Application of a new version of the k-W model of turbulence to equilibrium boundary layer flow over a flat plate with: (1) intense heat transfer and (2) streamwise adverse pressure gradients [CFD/82/14] N83-27181
DIF1: A dispersion program which can handle pollution and reflection [ATMOS/82/11] N83-27478
Application of computer modeling to the study of the thermodynamic forces acting on a building [AD-A125227] N83-27894

CONVERGENCE
The role of convergence in stereoscopic depth constancy [AD-A124231] N83-27590
Existence and convergence of random set distributions [CTH-MATH-1983-3] N83-27691

CONVERGENT NOZZLES
JT150 1/2-scale nozzle jet noise experiment and comparison with prediction [NASA-TM-83370] N83-27793

CONVOLUTION INTEGRALS
Convolution techniques in analytical electrochemistry [DE82-018531] N83-26954

COOLING
Gasification in pulverized coal flames. Investigation of pulverized coal-combustors and gasifiers: Multiple sub-reactor model and experimental results, part 2 [DE82-013001] N83-26965
Aquifer thermal-energy-storage costs with a seasonal-chill source [DE83-006700] N83-27382
Project DEEP STEAM [DE82-016394] N83-27389
City of Tucson solar code [DE82-016788] N83-27418
Validation of passive-solar analysis/design tools using class A performance-evaluation data [DE82-017588] N83-27420
Intermediate photovoltaic system application experiment operational performance report for G. N. Wilcox Hospital, Kauai, Hawaii for September 1982, volume 5 [DE83-006843] N83-27454

COOLING SYSTEMS
Waveguide cooling system [NASA-CASE-NPO-15401-1] N83-27085
Traveling-wave tube amplifier characteristics study for stochastic beam-cooling experiments [DE83-005867] N83-27132
Critical flow data review and analysis [DE82-902199] N83-27172
Meteorological Effects of Thermal Energy Releases (METER) program [DE83-008313] N83-27502

COORDINATES
Input generator for Denton 3-dimensional turbomachine-blade-row analysis code [NASA-TM-23324] N83-26817
Aerodynamic characteristics of generalized bent biconic bodies for aero-assisted, orbital-transfer vehicles [NASA-TM-84362] N83-26918

Ideal MHD stability calculations in axisymmetric toroidal coordinate systems
[DE82-009830] N83-27866

COPOLYMERS
Preparation, characterization, physical testing and performance of fluorocarbon membranes and separators
[NASA-CR-167880] N83-26936
Research in energetic compounds
[AD-A124911] N83-27024
Phase equilibria and transition in mixtures of a homopolymer and a block copolymer. 2: The phase diagram
[AD-A124929] N83-27025

COPPER
Use of microhardness to determine the strengthening and microstructural alterations of 14-MeV-neutron-irradiated metals
[DE82-014002] N83-27000
Continuous cable processing by the physical vapor deposition technique
[DE83-006011] N83-27003
Medium dependence of charge state fractions of MeV He beam N83-27718
Thermal conductance of pressed contacts at liquid helium temperatures
[NASA-TM-84365] N83-27876

COPPER ALLOYS
Effects of hydrazine and pH on the corrosion of copper-alloy materials in AVT environments with oxygen
[DE83-901124] N83-27004

COPPER SELENIDES
Cadmium sulfide/copper ternary heterojunction cell research
[DE83-000997] N83-27451

COPPER SULFIDES
Development of copper sulfide/cadmium thin-film solar cells
[DE82-014308] N83-27416

CORONAS
An investigation of the dynamics of the plasma corona
[DE82-019397] N83-27867

CORRECTION
A novel general purpose computer correction procedure for quantitative X-ray fluorescence analysis
[LGC-1/1982] N83-26987
Analysis of streak-camera measurement errors caused by misorientation of the camera slit with recording direction
[DE83-005970] N83-27197

CORRELATION
Enhanced tracking of airborne targets using a correlator-Kalman filter
[AD-A124884] N83-27097
The influence of flux composition on the chemistry and cleanliness of 2 1/4Cr-1Mo steel electroslag weld metal N83-27234

CORRELATION COEFFICIENTS
Effects of particle characteristics on performance of RRSK PETN
[DE82-018553] N83-27044
Frequency charts using an iterative signal processing method --- voice signal processing
[FUB-16-1982] N83-27117

CORROSION
Analysis of a failed spent-char transfer line from the IGT HYGAS coal-gasification pilot plant
[DE82-014906] N83-26947
Passive films, surface structure and stress corrosion and crevice corrosion susceptibility
[AD-A124879] N83-26995

CORROSION RESISTANCE
Effects of hydrazine and pH on the corrosion of copper-alloy materials in AVT environments with oxygen
[DE83-901124] N83-27004
A statistical approach to the study of localized corrosion
[AERE-R-10832] N83-27014
Simulated heat-exchanger tubes: DOE Geothermal Test Facility, East Mesa, California
[DE83-007415] N83-27391

COSMIC RAYS
Error analysis and prevention of cosmic ion-induced soft errors in static CMOS RAMS
[DE82-018967] N83-27610
Electron-positron annihilation and the cosmic X-ray background N83-27935

COSMOLOGY
A finite-particle-number approach to physics
[DE83-007014] N83-27791

COST ANALYSIS
Cost analysis of Navy acquisition alternatives for the NAVSTAR Global Positioning System
[AD-A125017] N83-26909
Acid rain: Control strategies for coal-fired utility boilers, volume 1
[DE83-006695] N83-27511
User manual AQUASTOR: A computer model for cost analysis of aquifer thermal-energy storage coupled with district heating or cooling systems. Volume 2: Appendices
[DE82-013889] N83-27631

COST EFFECTIVENESS
Audio direct broadcast satellites N83-26857
Aquifer thermal-energy-storage costs with a seasonal-chill source
[DE83-006700] N83-27382
Increased efficiency of hydroelectric power
[DE82-905771] N83-27403
Acid rain: Control strategies for coal-fired utility boilers, volume 1
[DE83-006695] N83-27511
Project scheduling with resource considerations
[AD-A124938] N83-27901

COST ESTIMATES
Cost analysis of Navy acquisition alternatives for the NAVSTAR Global Positioning System
[AD-A125017] N83-26909
Cost/design study and fabrication/testing of a 300-W gas-recombination device for utility lead-acid cells
[DE82-019800] N83-27468

COUETTE FLOW
On Synge's criterion for the stability of plane Couette flow N83-26802

COULOMB POTENTIAL
Empirical stopping powers for ions in solids N83-27706

COUNTING
Statistical review of counting accelerometer data for Navy and Marine fleet aircraft
[AD-A124966] N83-26834

COUPLING
Prediction of the seismic responses of R/C frame-coupled wall structures
[PB83-149203] N83-27083
Design considerations for a developmental high power coupling loop to drive a resonant load N83-27762
Post coupler studies for Alvarez tanks to be used for high power or variable energy N83-27763
Variable-energy drift-tube linacs N83-27764
Loop coupling to a Radio Frequency Quadrupole resonator (RFQ) N83-27766

COVARIANCE
Numerical computation of the matrix Riccati equation for heat propagation during space shuttle reentry
[AD-A124873] N83-26916
Existence of unbiased covariance components estimators
[AD-A125299] N83-27650

COVERINGS
The use of vortex generators as inexpensive compressor casing treatment N83-26798

CRACK INITIATION
Kinetics of void formation in strained metals
[ISSN-0208-5658] N83-26993
A study of elastic-plastic fracture parameters through the thickness of fracture toughness specimens using silicone-rubber crack impressions
[AERE-R-10815] N83-27280

CRACK PROPAGATION
Kinetics of hydrogen-induced stress corrosion cracking. Part 1: Important features of cracking with regard to high strength steels
[BLL-RISLEY-TRANS-4701(9091.9F)] N83-26990
Slow crack growth in spinel in water
[NASA-TM-85644] N83-27017
Creep deformation and crack growth in a low alloy steel welded pressure vessel containing defects N83-27225
Dissimilar weld failure analysis and development program N83-27239
Crack layer morphology and toughness characterization in steels
[NASA-CR-168154] N83-27256
Propagation of creep cracks by cavitation in fine-grained materials
[DE83-005869] N83-27268
Fatigue crack growth from blunt notches
[GKSS-82/E/44] N83-27276

CRACK TIPS
Fatigue crack growth from blunt notches
[GKSS-82/E/44] N83-27276
A study of elastic-plastic fracture parameters through the thickness of fracture toughness specimens using silicone-rubber crack impressions
[AERE-R-10815] N83-27280

CRACKING (CHEMICAL ENGINEERING)
Dissociated methanol test results
[DE82-013565] N83-27054

CRACKS
Nonlinear response arising from non self-similar crack growth in finite thickness plates
[DE83-005946] N83-27267

CRAY COMPUTERS
STOP: A fast method of disjointing binary product sets
[DE83-007463] N83-27670

CREEP ANALYSIS
The 48 hour multiaxial creep and recovery of 2618 aluminum alloy at 200C
[AD-A124993] N83-26998

CREEP PROPERTIES
Multiaxial creep of 2618 aluminum under proportional loading steps
[AD-A125023] N83-26997
Technological characteristics of creep-feed grinding. Raised cutting forces and reduced work piece temperatures, part 2
[PNR-90164-PT-2] N83-27075
Design requirements for creep-feed grinders, part 3. Application of outside diameter creep-feed grinding, part 4
[PNR-90165-PT-3/4] N83-27076
Creep deformation and crack growth in a low alloy steel welded pressure vessel containing defects N83-27225
A finite element analysis of the creep response of lumbar intervertebral joints in the Rhesus monkey
[AD-A124740] N83-27570

CREEP RUPTURE STRENGTH
Analysis of elevated-temperature tensile and creep properties of normalized and tempered 2-1/4 Cr-1 Mo steel
[DE82-018160] N83-27010
Response of bainitic 2 1/4 Cr-1 Mo steel to creep-fatigue loadings at 482 deg C
[DE82-017445] N83-27011
Creep characteristics of butt welded joints for thick 2 1/4Cr-1Mo pipework and pressure vessels N83-27233
Creep rupture and creep crack growth behaviour of transition joints N83-27237
Damage accumulation and failure criteria in 'creep brittle' ferritic weldment structures N83-27238

CREEP STRENGTH
Mechanisms of damage accumulation in time-dependent cyclic deformation
[DE83-000993] N83-27002

CREEP TESTS
Creep characteristics of butt welded joints for thick 2 1/4Cr-1Mo pipework and pressure vessels N83-27233
Creep rupture and creep crack growth behaviour of transition joints N83-27237

CRITICAL FLOW
Critical flow data review and analysis
[DE82-902199] N83-27172

CRITICAL TEMPERATURE
Thermochemistry of mixed explosives
[DE82-012149] N83-27045

CROP GROWTH
Overview of fuel alcohol from agricultural crops with emphasis on the Tennessee Valley
[DE82-016932] N83-27050
Yield forecasting from remote sensing data: A survey of methods available in 1982 --- crop yield
[REPT-M/83/5] N83-27343

CROP INVENTORIES
Establishment of a center of excellence for applied mathematical and statistical research
[E83-10307] N83-27297
Technical summary of accomplishments made in preparation for the USSR barley exploratory experiment
[E83-10315] N83-27304
Research and development of LANDSAT-based crop inventory techniques
[E83-10359] N83-27325

CROP VIGOR
Study to assess the importance of errors introduced by applying NOAA 6 and NOAA 7 AVHRH data as an estimator of vegetative vigor: Feasibility study of data normalization
[E83-10346] N83-27321

CROSS CORRELATION
Cross correlation analysis to determine the environmental parameters correlated with electro-optical system performance
[AD-A124886] N83-27544

CROSS FLOW
Experimental investigation of jets in a cross flow --- turbulent flow
[KU-SFB-80/E/219] N83-27177

CROSS SECTIONS
Perturbed stationary-state description of the polarization effect in innershell ionization N83-27705
Calculation of the equilibrium mean charge of helium ions N83-27717

CROSSLINKING
Preparation, characterization, physical testing and performance of fluorocarbon membranes and separators
[NASA-CR-167880] N83-26936

Role of amines in adhesion of polybutadiene to glass substrates. 4: The effect of amine structure and concentration on the strength of adhesion
[AD-A121686] N83-27028

CRUDE OIL
Libya, Algeria and Egypt: Crude oil potential from known deposits
[DE82-018578] N83-27334
Instrumental photon activation analysis using the linear accelerator at the Naval Postgraduate School
[AD-A125003] N83-27811

CRYSTAL DEFECTS
Experimental characterization of the flux-line lattice in superconducting V3Si
[DE83-004647] N83-27888

CRYSTAL DISLOCATIONS
Ultrasonic wave attenuation spectra in steels
[AERE-R-10753] N83-27808

CRYSTAL GROWTH
Large-area sheet task: Advanced dendritic-eb-growth development
[NASA-CR-172683] N83-27353
Thermal analysis of the vertical bridgman semiconductor crystal growth technique
[NASA-CR-172627] N83-27875

CRYSTAL LATTICES
Kinetics of void formation in strained metals
[ISSN-0208-5658] N83-26993
Deep impurities: A crystalline cluster approach
[INPE-2717-PRE/303] N83-27878
Fluxoid pinning by grain boundaries in bicrystals and polycrystals of niobium
[DE82-017406] N83-27891

CRYSTAL STRUCTURE
Mechanisms of damage accumulation in time-dependent cyclic deformation
[DE83-000993] N83-27002
Properties of three-dimensional energetic solids and molecular crystals
[AD-A124944] N83-27880
Electronic-energy-band structure of uranium hydride
[DE82-016393] N83-27884

CRYSTALLIZATION
Polymers in mechanical systems: Structure-property requirements
[DE83-005590] N83-27029
Geothermal scale control by crystallization (RP1525-2) N83-27378
Preparation and characterization of glassy and crystalline mixed chalcopyrite semiconducting compounds
[DE83-005352] N83-27889

CRYSTALS
Experiments with phase transitions at very high pressure — compressed solidified gases, semiconductors, superconductors, and molecular crystals
[NASA-CR-3696] N83-27879
Scintillation analysis of gamma radiation with crystals of bismuth germanate
[AD-A124991] N83-27882

CUBANE
Molecular-orbital calculations for polynitropolyhedranes
[DE82-018390] N83-27023

CUBES (MATHEMATICS)
Box truss development and applications N83-26876

CUMULUS CLOUDS
Waterspout, gust fronts and associated cloud systems
[NASA-TM-85032] N83-27538

CURING
Ultrasonic mixing of epoxy curing agents
[NASA-TM-85643] N83-27018
Role of amines in adhesion of polybutadiene to glass substrates. 1: Reactions of amines during peroxide curing of polybutadiene
[AD-A121685] N83-27027
Role of amines in adhesion of polybutadiene to glass substrates. 4: The effect of amine structure and concentration on the strength of adhesion
[AD-A121686] N83-27028
Interfacing a torsion pendulum with a microcomputer
[DE83-004032] N83-27792

CURRENT DENSITY
Development of photoelectrochemical cells based on compound semiconductors and nonaqueous electrolytes
[DE82-013700] N83-26968
Anode phenomena in vacuum arcs
[DE83-007181] N83-27141
Proceedings of the Los Alamos Neutrino Workshop
[DE83-000427] N83-27812

CURRENT DISTRIBUTION
Linear problem of inductor synthesis for a Tokamak thermonuclear apparatus
[BLL-CTO-2116-(9091.9F)] N83-27852
Measurement of the helical field of JIPP T-11
[IPPJ-825] N83-27855

CURRENT REGULATORS
Electronic system for high power load control — solar arrays
[NASA-CASE-NPO-15358-1] N83-27126

CURVATURE
Submodular set functions, amtroids and the greedy algorithm: Tight worst-cast bounds and some generalizations of the Rado-Edmonds theorem
[AD-A124981] N83-27671

CURVE FITTING
Convolution techniques in analytical electrochemistry
[DE82-018531] N83-26954

CURVES (GEOMETRY)
Using pyramids to detect good continuation
[AD-A124848] N83-27616
Automated C-V and Y omega meson curves for MOS device analysis
[DE82-014268] N83-27886

CYCLES
Evaluation program for secondary spacecraft cells. Cycle life test
[NASA-CR-172679] N83-27351

CYCLIC LOADS
A method for testing components in the high acceleration frequency range
[TULEA-1981-18] N83-27269

CYCLOGENESIS
Low latitude upper tropospheric cyclonic vortices in the South Atlantic: Their origin, characteristics and effects on tropical convection over eastern Brazil
[INPE-2729-PRE/311] N83-27540

CYCLOHEXANE
Elastic constants of plastic crystals by Schaefer-Bergmann scattering: Crystalline cyclohexane and deuteromethane
[DE82-018660] N83-27885

CYCLONES
Southern Hemisphere application of the Navy nested tropical cyclone model
[AD-A125011] N83-27545

CYLINDRICAL BODIES
Computation of incompressible potential flow over an airfoil using a high order aerodynamic panel method based on circular arc panels
[AD-A124896] N83-26825
Wave forces on circular cylinders with large excrescences at low Keulegan and Carpenter numbers — water waves
[NMI-R-133] N83-27254

CYLINDRICAL SHELLS
The influence of some second order effects on the behaviour of rigid plastic shells at the yield point load
[ISSN-0208-5658] N83-27252
Stability of laminated composite shells subjected to uniform axial compression and torsion
[AD-A125204] N83-27262

CYLINDRICAL TANKS
Further study of the earthquake response of a broad cylindrical liquid-storage tank model
[PB83-147744] N83-27277

CYTOGENESIS
Investigation of adaptive processes in peripheral blood using mathematical modeling methods N83-27575

CZOCHRALSKI METHOD
Growth and characterization of Czochralski-grown n and p-type GaAs for space solar cell substrates
[NASA-CR-168099] N83-27877

D

DAMAGE
The numerical solution of pressure oscillations in an open cavity N83-26793
Propagation of creep cracks by cavitation in fine-grained materials
[DE83-005869] N83-27268

DAMAGE ASSESSMENT
Mechanisms of damage accumulation in time-dependent cyclic deformation
[DE83-000993] N83-27002
Comparison of neutron and heavy-ion damage in a stable austenite
[DE82-017369] N83-27009
Response of bainitic 2 1/4 Cr-1 Mo steel to creep-fatigue loadings at 482 deg C
[DE82-017445] N83-27011
Analysis of progressive collapse of complex structures
[AD-A125266] N83-27260

DAMPING
Transverse coherent instabilities and a dipole feedback damper for coexisting coasting and bunched beams
[DE82-016613] N83-27869

DAMS
Joint opening nonlinear mechanism: Interface smeared crack model
[PB83-149195] N83-27084

DATA ACQUISITION
Fundamental pyrolysis studies
[DE82-009808] N83-26969
Quantitative analysis of TATB impurities by thin layer chromatography
[DE83-007094] N83-26977
Australia ground data collection 1981-82 crop year, appendixes A and B, volume 2
[E83-10316] N83-27305
Australia ground data collection 1981-82 crop year, volume 1
[E83-10317] N83-27306
Wind-systems technical notes: 1981
[DE83-007202] N83-27384
Data report for the Southwest Residential Experiment Station, February 1982
[DE82-016330] N83-27398
Validation of passive-solar analysis/design tools using class A performance-evaluation data
[DE82-017588] N83-27420
Cadmium sulfide/copper ternary heterojunction cell research
[DE83-000997] N83-27451
Statistical and theoretical research N83-27487
Bathymetric data and analysis for the NRL remote sensing experiment: Phelps Bank, July 1982
[AD-A125220] N83-27563
New FORTRAN computer programs to acquire and process isotropic mass-spectrometric data
[DE82-019901] N83-27629
Predicting low-probability/high-consequence events
[DE82-018373] N83-27688

DATA BASE MANAGEMENT SYSTEMS
Research and analysis of head-directed area-of-interest visual system concepts
[NASA-CR-166480] N83-26849
Statistical and theoretical research N83-27487
Concepts evaluation model V input-data system
[AD-A124891] N83-27908
A backend data base system for the Eglin computer network
[AD-A124908] N83-27911
SAM: A semantic association model for corporate and scientific/statistical database
[DE83-006510] N83-27916
Index encoding: A compression technique for large statistical databases
[DE83-006431] N83-27917
Methodology for view integration in logical database design
[DE83-005754] N83-27918

DATA BASES
Research and analysis of head-directed area-of-interest visual system concepts
[NASA-CR-166480] N83-26849
Soot formation in synthetic-fuel droplets
[DE82-018420] N83-26958
General mechanism analysis package
[DE82-008158] N83-27060
Towards very large vocabulary word recognition
[AD-A125224] N83-27094
Composition and assembly of a spectral and agronomic data base for 1980 spring small grain segments
[E83-10311] N83-27301
Particle resuspension and translocation N83-27496
Note on the elastic-scattering of few-MeV neutrons from elemental calcium
[DE82-019476] N83-27827
Coordination of Physical, Chemical, and Thermodynamic Properties for Coal Conversion: Proceedings of the Oak Ridge Conference
[DE83-007169] N83-27898
Microcircuit radiation effects databank
[NASA-TM-85346] N83-27903
Design of a distributed data base management system for use in the AFIT Digital Engineering Laboratory
[AD-A124821] N83-27905
Development of a query processor for a back-end multiprocessor relational database computer
[AD-A124885] N83-27907
Query optimization in distributed databases
[AD-A124921] N83-27909
The performance measurement of a relational database system using monitoring and modeling techniques
[AD-A124919] N83-27910
The continued design and implementation of a relational database system
[AD-A124927] N83-27912
Documenting content of technical databases
[DE82-017526] N83-27914

DATA LINKS
Concepts for connectivity and interoperability of world space data networks: INPE proposal to CCSDS/Panel 3
[INPE-2722-PRE/307] N83-27088
Performance of sequentially decoded long constraint length codes for a satellite communications link in a scintillated channel
[AD-A124814] N83-27093
Networking DEC and IBM computers
[NASA-TM-85019] N83-27633
DATA MANAGEMENT
The continued design and implementation of a relational database system
[AD-A124927] N83-27912
DATA PROCESSING
Programs for the transonic wind tunnel data processing installation. Part 10: Six component measurements updated
[AD-A122248] N83-26824
Improved version of the split routine for CLASSY
[E83-10306] N83-27296
Assembly language coding for CLASSY
[E83-10309] N83-27299
The classification of LANDSAT data for the Orlando, Florida, urban fringe area
[E83-10327] N83-27311
Beer's-law-based, simple spectral model for direct normal and diffuse horizontal irradiance
[DE83-006132] N83-27526
Meteorological tower data, Grand Junction Tailings Site, Colorado
[DE82-018919] N83-27555
NIGEL: A systemic grammar for text generation
[AD-A125253] N83-27622
New FORTRAN computer programs to acquire and process isotropic mass-spectrometric data
[DE82-019901] N83-27629
Summaries of the FY 1982 Applied Mathematical Sciences Research Program
[DE83-005815] N83-27668
Evaluation of the detection capacity of methods of monitoring data reliability
[PNR-90160] N83-27677
Comparison of estimators of beta parameters for fitting binomial data with varying p
[DE83-006641] N83-27690
Index encoding: A compression technique for large statistical databases
[DE83-006431] N83-27917
Methodology for view integration in logical database design
[DE83-005754] N83-27918
DATA PROCESSING EQUIPMENT
Development of a query processor for a back-end multiprocessor relational database computer
[AD-A124885] N83-27907
DATA PROCESSING TERMINALS
A new approach for solving simultaneous resource possession problems in closed queueing networks
[AD-A124877] N83-27637
DATA RECORDERS
Shock-hardened, high-frequency, PCM system with memory for Earth-penetrator-study applications
[DE82-017644] N83-27242
DATA REDUCTION
Wildland inventory and resource modeling for Douglas and Carson City Counties, Nevada, using LANDSAT and digital terrain data
[E83-10302] N83-27293
Establishment of a center of excellence for applied mathematical and statistical research
[E83-10307] N83-27297
A nonparametric clustering technique which estimates the number of clusters
[E83-10310] N83-27300
Comparison of estimators of beta parameters for fitting binomial data with varying p
[DE83-006641] N83-27690
DATA RETRIEVAL
NASA STI-RECON Bulletin and Tech Info News
[NASA-CR-172685] N83-27904
DATA SIMULATION
Atmospheric effects on METSAT data
[E83-10314] N83-27303
DATA STORAGE
Sandia Micro Generation for Integrated Circuits (SMAGIC) system and the hierarchical artwork (HAT) language
[DE82-009912] N83-27134
SCRAP: A language for systems programming
[CSIR-TWISK-263] N83-27614
An NMR study of hydrogen diffusion in metal hydrides containing parametric impurities
[DE83-004859] N83-27890
The continued design and implementation of a relational database system
[AD-A124927] N83-27912
DATA STRUCTURES
Concepts for a Standard Data Interchange Structure (SDIS) INPE proposal to CCSDS/Panel 3
[INPE-2724-PRE/308] N83-27087
DATA SYSTEMS
Production planning, production systems for flexible automation
[PNR-90150] N83-27067
Concepts for a Standard Data Interchange Structure (SDIS) INPE proposal to CCSDS/Panel 3
[INPE-2724-PRE/308] N83-27087
DATA TRANSMISSION
Dissemination of digital satellite imagery through telephone lines
[INPE-2725-PRE/309] N83-27089
A model for forecasting the country's general use data transmission network
[AD-A124847] N83-27095
The statistical properties of autosynchronizing scramblers — data transmission
[FUB-21-1982] N83-27120
Design of an additive scrambler for parallel connection with numerical multiplexers at 565 Mb/sec — data transmission
[FUB-22-1982] N83-27121
Statistical properties of the sequences produced by additive scramblers — data transmission
[FUB-23-1982] N83-27122
A flow control scheme considering retransmissions in packet switched datagram transport networks
[FUB-32-1982] N83-27125
Networking DEC and IBM computers
[NASA-TM-85019] N83-27633
Protocol translation and translators for heterogeneous computer networks
[DE83-007379] N83-27636
DEACTIVATION
Deactivation and regeneration of hydrogenolysis activity over Rh-Ag bimetallic catalysts supported on TiO2
[DE82-011240] N83-27449
DECARBURIZATION
Measurement of the carbon activity of sodium with foils consisting of Fe-20Mn and stainless steel types A304L and 316L
[BLL-RISLEY-TRANS-4719(9091.9F)] N83-26989
DECAY
Hunt for the 1(1)P sub 1 bound state of charmonium
[DE82-009520] N83-27829
DECAY RATES
Note on the elastic-scattering of few-MeV neutrons from elemental calcium
[DE82-019476] N83-27827
The Gamow-Teller strength functions and neutrino problems
[DE82-018357] N83-27828
DECIDUOUS TREES
Detection of aspen/conifer forest mixes from multitemporal LANDSAT digital data — Bear River Range, Rocky Mountains
[E83-10324] N83-27309
DECIMETER WAVES
Effect of decimeter waves on functional state of cardiovascular system, some biochemical and immunological parameters of patients recovering from myocardial infarction N83-27573
DECISION MAKING
Energy future Santa Cruz: A citizens' plan for energy self-reliance
[PB83-1[illegible]6960] N83-27475
Knowledge and skill differences in novices and experts
[AD-A124466] N83-27592
Modeling human decision processes in command and control
[AD-A125218] N83-27595
Psychological and system variables in team problem solving: Experimental studies of computer-mediated participation
[AD-A124924] N83-27596
Human information processing guidelines for decision-aiding displays
[AD-A124858] N83-27599
DECODING
Performance of sequentially decoded long constraint length codes for a satellite communications link in a scintillated channel
[AD-A124814] N83-27093
Decoding and synchronization of error correcting codes
[ENST-E-83001] N83-27113
DEFECTS
Creep deformation and crack growth in a low alloy steel welded pressure vessel containing defects N83-27225
DEFLECTION
Heating measurements on Space Shuttle Orbiter models with differentially deflected elevons
[NASA-TM-84846] N83-27151
DEFOCUSING
The design of double sided microtrons N83-27778
DEFORMATION
Creep deformation and crack growth in a low alloy steel welded pressure vessel containing defects N83-27225
DEFORMETERS
Behavior of a rigid inclusion stressmeter in an anisotropic field
[DE82-016063] N83-27188
DEFROSTING
Engineering and manufacture of a high-efficiency, automatic defrosting refrigerator-freezer
[DE82-017480] N83-27065
DEGRADATION
Degradation of a laser beam by a turbulent jet N83-26799
Passive films, surface structure and stress corrosion and crevice corrosion susceptibility
[AD-A124879] N83-26995
DEGREES OF FREEDOM
Stability of an impact-loaded elastic column with two degrees of freedom
[TULEA-1981-05-T] N83-27270
The role of rotational degrees of freedom in heavy-ion collisions
[DE82-015751] N83-27820
DENDRITIC CRYSTALS
Large-area sheet task: Advanced dendritic-eb-growth development
[NASA-CR-172683] N83-27353
Process research on non-CZ silicon material
[NASA-CR-172684] N83-27381
DENSITOMETERS
Quantitative analysis of TATB impurities by thin layer chromatography
[DE83-007094] N83-26977
DENSITY (MASS/VOLUME)
Thermophysical properties of coal liquids
[DE82-013366] N83-26967
Diesel fuel oils, 1982
[DE83-006115] N83-27051
DENSITY (NUMBER/VOLUME)
Soot formation in synthetic-fuel droplets
[DE82-018420] N83-26958
DEPLOYMENT
Large deployable reflector: An infrared and submillimeter orbiting observatory N83-26858
Earth observation system: Spacecraft design N83-26861
A 15-meter deployable aperture microwave radiometer N83-26862
Systems design and comparative analysis of large antenna concepts N83-26863
Survey of deployable antenna concepts N83-26872
Status of deployable geo-truss development N83-26875
A large antenna system flight experiment N83-26905
Optimizing the space transportation system
[AD-A124920] N83-26913
Blake Plateau: Mid-depth and bottom current measurements
[PB83-144519] N83-27567
DEPOSITION
Development of photoelectrochemical cells based on compound semiconductors and nonaqueous electrolytes
[DE82-013700] N83-26968
Deposition of aerosols in sampling tubes
[DE82-017311] N83-27062
The influence of flux composition on the chemistry and cleanliness of 2 1/4Cr-1Mo steel electroslag weld metal N83-27234
Transparent heat-mirror materials and deposition technology
[DE83-007042] N83-27357
Air pollution dry deposition: Radioisotopes as particles and volatiles N83-27494
Processes of atmospheric deposition of metals and acids to forests
[DE82-017442] N83-27504
Sedimentology of the Mesaverde formation of Rifle Gap, Colorado and implications for gas-bearing intervals in the subsurface
[DE82-013396] N83-27530
DEPTH
A turbulence model for depth-averaged equations of motion — water currents
[TULEA-1981-07] N83-27174
The role of convergence in stereoscopic depth constancy
[AD-A124231] N83-27590

DESERTLINE
Monitoring land degradation in southern Tunisia: A test of LANDSAT imagery and digital data
[E83-10320] N83-27308

DESIGN ANALYSIS
Potential of composite materials in surface transportation applications
[DE83-007218] N83-26931
Dew points of hot gases from coal-gasification processes
[DE82-016337] N83-26964
Design of an additive scrambler for parallel connection with numerical multiplexers at 565 Mb/sec --- data transmission
[FUB-22-1982] N83-27121
Design of active impedance microwave monolithic circuits with a GaAs substrate
[ENST-E-82012] N83-27143
City of Tucson solar code
[DE82-016788] N83-27418
Validation of passive-solar analysis/design tools using class A performance-evaluation data
[DE82-017588] N83-27420
How to solve materials and design problems in solar heating and cooling, Energy Technology Review No. 77
[DE83-006116] N83-27456
Focussing considerations in the race track microtron and double-sided microtron N83-27774
The design of double sided microtrons N83-27778
Design of an electron beam spectral modification system N83-27779
Low-cost megawatt RF power sources for linear accel..rators to 70MHz and above
[LBL-13024] N83-27784
A 750 keV RFQ linac for the AGS polarized proton program N83-27788
Buncher section optimization of heavy ion RFQ linacs N83-27790
LAMPF transition region
[DE82-019489] N83-27824
Incinerator development program for processing transuranic waste at the Idaho National Engineering Laboratory
[DE82-017265] N83-27839
Use of the regularization method for designing the equilibrium system of a Tokamak reactor having a specified plasma geometry
[BLL-CTO-2117-(9091.9F)] N83-27851

DESORPTION
Thermal Desorption Spectroscopy (TDS) of hydrogen from niobium
[DE82-012024] N83-26981
Analysis of electronic desorption
[DE82-018591] N83-27832
Mechanisms of electronic description
[DE82-018590] N83-27887

DESULFURIZING
Implications of emerging environmental-control technologies for air-pollution regulations
[DE83-005901] N83-27508
Acid rain: Control strategies for coal-fired utility boilers, volume 1
[DE83-006695] N83-27511

DETECTION
Hunt for the 1(1)P sub 1 bound state of charmonium
[DE82-009520] N83-27829

DETERGENTS
A study of solvent and aqueous cleaning of fluxes
[AD-A124950] N83-26994

DETONATION
Jet penetration of inerts and explosives
[DE83-003746] N83-27052
Fundamental study of dense-fluid detonation
[AD-A125300] N83-27156

DETONATION WAVES
Oblique interactions of detonation waves with explosive/metal interfaces
[DE83-007119] N83-27038

DEUTERIUM
Retention and recycling of plasma-edge hydrogen isotopes in C and TiC
[DE82-019959] N83-27814

DEUTERONS
Matching the RF quadrupole beam to the drift tube section in the FMIT accelerator N83-27732

DEVICES
SCRAP: A language for systems programming
[CSIR-TWISK-263] N83-27614

DEW POINT
Dew points of hot gases from coal-gasification processes
[DE82-016337] N83-26964
The impact of conventional surface data upon VAS regression retrievals in the lower troposphere
[NASA-TM-83987] N83-27523
Interface unit for relative humidity measurement with dew point meter
[FOA-C-30309-E] N83-27556

DIATOMIC MOLECULES
Thermal dissociation of diatomic molecules N83-26810
Investigation of the potential functions of weakly bound diatomic molecules and laser-assisted excitive Penning ionization
[DE82-017259] N83-27833

DICTIONARIES
Towards very large vocabulary word recognition
[AD-A125224] N83-27094

DIELECTRIC PROPERTIES
High frequency, high power capacitor development
[NASA-CR-168035] N83-27127

DIELECTRICS
Dielectrics for radiation-hard capacitors: Polyvinylidene fluoride and polyethylene terephthalate
[DE82-019903] N83-27137
Stopping of swift ions in condensed matter: The theory of effective charge N83-27714
Effective charge of energetic ions in metals N83-27715

DIESEL ENGINES
Status of alcohol fuels utilization technology for highway transportation: A 1981 perspective. Volume 2: Compression-ignition engines
[DE83-008127] N83-27036
Overview of fuel alcohol from agricultural crops with emphasis on the Tennessee Valley
[DE82-016932] N83-27050
The Cummins advanced turbocompound diesel engine evaluation
[NASA-CR-168042] N83-27923

DIESEL FUELS
Diesel fuel oils, 1982
[DE83-006115] N83-27051

DIFFERENTIAL EQUATIONS
Improved analytical and numerical techniques for calculating explosions and implosions N83-26801
Sensitivity analysis for premixed, laminar, steady-state flames
[AD-A123866] N83-26938
A calculation of wrinkled flames
[AD-A125258] N83-26943
Large amplitude time periodic solutions of a semilinear wave equation
[AD-A125257] N83-27654
Differentiation and generation of Taylor coefficients in PASCAL-SC
[AD-A125246] N83-27655
Linear parabolic equations with a singular lower order coefficient
[AD-A125245] N83-27656

DIFFUSION
Advances in ejector technology: A tribute to Hans von Ohain's vision N83-26805
Hydrogen transport in and through niobium
[DE82-017214] N83-26980
A computer program for the simulation of heat and moisture flow in soils
[E83-10342] N83-27317
Process research on non-CZ silicon material
[NASA-CR-172684] N83-27381
New pollutant dispersion model for application in mountain valleys
[DE83-005289] N83-27509
An NMR study of hydrogen diffusion in metal hydrides containing parametric impurities
[DE83-004859] N83-27890

DIFFUSION COEFFICIENT
Effects of magnetic impurities on the apparent diffusion coefficient of hydrogen in metal hydrides deduced from NMR
[DE82-019124] N83-26979

DIFFUSION WAVES
State space models of the Nash cascade: Kinematic and diffusion waves --- dynamic hydrology systems
[TULEA-1981-14] N83-27341

DIFFUSION WELDING
Welding technology for energy conversion N83-27216
Welding technologies and materials for energy applications in Japan N83-27218

DIGITAL COMPUTERS
Ignition and flame-propagation studies with adaptive numerical grids
[DE83-005462] N83-26976
A visit to the Computer Science Department
[AD-A124855] N83-27607
The X-Y digital plotter as an output unit for the CDRA 1325 digital computers
[AD-A124799] N83-27608

DIGITAL DATA
Dissemination of digital satellite imagery through telephone lines
[INPE-2725-PRE/309] N83-27089
Detection of aspen/conifer forest mixes from multitemporal LANDSAT digital data — Bear River Range, Rocky Mountains
[E83-10324] N83-27309
Effects of autocorrelation upon LANDSAT classification accuracy --- Richmond, Virginia and Denver, Colorado
[E83-10328] N83-27312

DIGITAL FILTERS
On the discretization of the continuous Nash-cascade --- hydrological forecasting
[TULEA-1981-17] N83-27342

DIGITAL SIMULATION
Simulation of multipath propagation on digital radiolinks
[FOA-A-30032-E2] N83-27111

DIGITAL SYSTEMS
Digital flight control system validation
[AD-A124506] N83-26847
Space flight experience with the Shuttle Orbiter control system N83-26900
Development and application of fully-automated EBIC techniques for solar-cell measurements
[DE82-014409] N83-27415
Biomedical applications of digital autoradiography with a MWPC
[DE82-017055] N83-27571
Automatic test generation using a matrix model of digital systems
[DE82-009988] N83-27693
Design of a distributed data base management system for use in the AFIT Digital Engineering Laboratory
[AD-A124821] N83-27905

DIGITAL TECHNIQUES
Decoding and synchronization of error correcting codes
[ENST-E-83001] N83-27113
Shock-hardened, high-frequency, PCM system with memory for Earth-penetrator-study applications
[DE82-017644] N83-27242
Effect of scene illumination conditions on digital enhancement techniques of multispectral scanner LANDSAT images
[E83-10344] N83-27319
Design of a distributed data base management system for use in the AFIT Digital Engineering Laboratory
[AD-A124821] N83-27905

DIRECTIONAL SOLIDIFICATION (CRYSTALS)
Interaction of ceramics with molten materials during directed crystallization
[PNR-90155] N83-27030

DISKS (SHAPES)
Effects of radial support stems on the disk-and-washer structure N83-27743

DISLOCATIONS (MATERIALS)
Comparison of neutron and heavy-ion damage in a stable austenite
[DE82-017369] N83-27009

DISPLACEMENT
The post-processing approach in the finite element method. Part 1: Calculation of displacements, stresses, and other higher derivatives of the displacements
[AD-A125039] N83-27660

DISPLACEMENT MEASUREMENT
A study of elastic-plastic fracture parameters through the thickness of fracture toughness specimens using silicone-rubber crack impressions
[AERE-R-10815] N83-27280

DISPLAY DEVICES
The VDU operators' preferred environmental conditions in a telephone information center --- video display device luminance
[TULEA-1982-11] N83-27603

DISSOCIATION
Dissociated methanol test results
[DE82-013565] N83-27054
Interactions of fast molecular ions traversing thin foils: The contribution from field-ionized Rydberg atoms in measurements on Convoy electrons N83-27720
Diffractive interactions of hadrons at high energies
[DE82-019463] N83-27830

DISTANCE
The role of convergence in stereoscopic depth constancy
[AD-A124231] N83-27590

DISTILLATION
Computer-aided analysis of energy consumption in ethanol-water distillation operations
[DE82-014333] N83-27413

DISTORTION
Dynamic distortion in a short s-shaped subsonic diffuser with flow separation --- Lewis 8 by 6 foot Supersonic Wind Tunnel
[NASA-TM-84312] N83-26838
Detectability of defects by thermal non-destructive testing
[AERE-R-10802] N83-27250
DISTRIBUTED PROCESSING
Bringing a large computer network into FOCUS
[DE82-010412] N83-27635
Design of a distributed data base management system for use in the AFIT Digital Engineering Laboratory
[AD-A124821] N83-27905
DISTRIBUTION FUNCTIONS
An efficient algorithm for generating random number pairs drawn from a bivariate normal distribution
[NASA-TP-2173] N83-27679
DIURNAL VARIATIONS
Intermediate photovoltaic system application experimental operational performance report for Newman Power Station, El Paso, Texas for September 1982, volume 15
[DE83-006845] N83-27459
Intermediate photovoltaic system application experiment operational performance report for Beverly High School, Beverly, Massachusetts for August 1982, volume 12
[DE83-007092] N83-27460
Kahuku kite wind study. 1: Kahuku beach boundary layer
[DE83-006403] N83-27553
Kahuku kite wind study. 2: Kahuku foothills
[DE83-006402] N83-27554
Tidal and lunar data for Point Mugu, San Nicolas Island, and the Barking Sands area during 1983
[AD-A124810] N83-27565
DIVERTERS
Experimental studies on pump limiters
[DE82-017408] N83-27868
DIVING (UNDERWATER)
A linearized, time dependent model of the heat transfer and thermoregulatory responses occurring upon immersion in cold water
[AD-A124972] N83-27586
DOCUMENTATION
NIGEL: A systemic grammar for text generation
[AD-A125253] N83-27622
The performance measurement of a relational database system using monitoring and modeling techniques
[AD-A124919] N83-27910
DOMES (STRUCTURAL FORMS)
Domed-grid-cathode project phases 1 and 2
[DE82-013844] N83-27136
DOMESTIC ENERGY
Thermal performance of a double-envelope house
[DE82-018061] N83-27417
Putting renewable energy to work in cities
[DE82-017237] N83-27472
DOPED CRYSTALS
Process research on non-CZ silicon material
[NASA-CR-172684] N83-27381
DOPPLER EFFECT
A new technique for reducing radar response to signals entering antenna sidelobes
[AD-A125191] N83-27101
DOPPLER RADAR
Numerical treatment of Doppler radar signals --- airport radar, video data
[ENST-E-82014] N83-27114
DOSIMETERS
Analysis of ANSI N13.11: The performance algorithm
[DE82-019212] N83-27628
DRAG MEASUREMENT
Flat-plate drag measurements with vortex generators in turbulent boundary layer
[NASA-CR-172125] N83-26814
DRIFT
Investigation of a third order baro-damped verticle channel of INS
[AD-A124882] N83-26828
DRIFT (INSTRUMENTATION)
A comparison of two methods for calculating wave drift forces --- water waves, offshore structures
[NMI-R-137] N83-27255
The image displacement instability in radial line accelerators N83-27777
DRIFT RATE
Mean wave drift forces: Theory and experiment --- water waves
[NMI-R-124] N83-27146
DRILLING
Method for milling and drilling glass
[NASA-CASE-GSC-12636-1] N83-27058
Geo energy research and development: Technology transfer update
[DE83-007225] N83-27395
Department of Energy's Western Gas Sands Project multi-well experiment update
[DE82-018291] N83-27529
DROPS (LIQUIDS)
Discussions with Jens
[DE82-016622] N83-27896
DRYING
A method for determining liquid volatility at ambient temperatures using an infrared gas analyzer
[AD-A124906] N83-26940
Implications of emerging environmental-control technologies for air-pollution regulations
[DE83-005901] N83-27508
DUCTED FLOW
Pulverized fuel and scaleup methodologies
[DE82-014822] N83-26962
Calculation of turbulence-driven secondary motion in noncircular ducts
[KU-SFB-80/T/220] N83-27178
DUCTILITY
Effects of ageing on the ductile-fracture mechanism in a high-strength low-alloy steel (300M)
[AERE-R-10783] N83-27015
Some observations on the physical metallurgy of nickel alloy weld metals N83-27240
DYNAMIC CHARACTERISTICS
Safe on-orbit experiment for measurement of large structures dynamics N83-26902
An instrument for measuring dynamic surface tension --- jet flow
[VTT-140] N83-27198
DYNAMIC PROGRAMMING
Towards very large vocabulary word recognition
[AD-A125224] N83-27094
DYNAMIC RESPONSE
Frequency-domain approach to passive building energy analysis
[DE82-019164] N83-27063
Joint opening nonlinear mechanism: Interface smeared crack model
[PB83-149195] N83-27084
Dynamic response of ramjet inlets to downstream perturbations
[AD-A125295] N83-27157
Further study of the earthquake response of a broad cylindrical liquid-storage tank model
[PB83-147744] N83-27277
DYNAMIC STABILITY
Design requirements for creep-feed grinders, part 3. Application of outside diameter creep-feed grinding, part 4
[PNR-90165-PT-3/4] N83-27076
DYNAMIC STRUCTURAL ANALYSIS
NASA/USAF research in structural dynamics N83-26870
Space Technology Experiment Platform (STEP). A Shuttle-borne support facility for structures, structural dynamics, and control technology flight experiments N83-26901
Safe on-orbit experiment for measurement of large structures dynamics N83-26902
MAST space research flight experiment N83-26904
A large antenna system flight experiment N83-26905
Moment-rotation characteristics of semi-rigid steel beam-column connections
[PB83-145318] N83-27081
Numerical dynamic analysis of structures by the finite dynamic element method
[AD-A125213] N83-27642
DYNAMOMETERS
Wind-systems technical notes: 1981
[DE83-007202] N83-27384

E

EARTH OBSERVATIONS (FROM SPACE)
Pushbroom radiometry and its potential using large space antennas N83-26860
Earth observation system: Spacecraft design N83-26861
EARTH ORBITS
Large space systems auxiliary propulsion requirements N83-26864
EARTH RESOURCES
Yield forecasting from remote sensing data: A survey of methods available in 1982 --- crop yield
[REPT-M/83/5] N83-27343
EARTHQUAKE RESISTANCE
Moment-rotation characteristics of semi-rigid steel beam-column connections
[PB83-145318] N83-27081
Further study of the earthquake response of a broad cylindrical liquid-storage tank model
[PB83-147744] N83-27277
EARTHQUAKES
Reliability aspects of structural control
[PB83-145482] N83-27082
ECOLOGY
Monitoring tropical vegetation succession with LANDSAT data
[E83-10306] N83-27296
Satellite monitoring of vegetation and geology in semi-arid environments --- Tanzania
[E83-10343] N83-27318
ECONOMIC ANALYSIS
Flash pyrolysis and hydropyrolysis of biomass
[DE82-015807] N83-26951
Hydrogen derived from ammonia: Small-scale costs
[DE82-012720] N83-27040
Aquifer thermal-energy-storage costs with a seasonal-chill source
[DE83-006700] N83-27382
Siting guidelines for utility application of wind turbines
[DE83-007426] N83-27393
End-Use Products of Fusion Energy: Alternatives and Their Implications to the Fusion Energy R and D Strategy
[PB83-151696] N83-27873
ECONOMIC FACTORS
After energy price decontrol: The role of government conservation programs
[RAND/N-1903-DOE] N83-27922
ECONOMIC IMPACT
Status, trends and implications of carbon fiber material use
[PB83-147751] N83-26934
ECONOMICS
The feasibility of biogas production on farms
[DE83-007385] N83-27385
ECOSYSTEMS
Large-scale operations management test of use of the White Amur for control of problem aquatic plants. Part 4. Third year poststocking results. Volume 6. The water and sediment quality of Lake Conway, Florida
[AD-A124443] N83-27479
Pacific Northwest Laboratory report to the DOE Office of Energy Research. Part 2: Environmental sciences
[DE83-007586] N83-27481
Terrestrial and riverine ecology N83-27482
Marine research N83-27483
Ecological effects of coal conversion N83-27484
Radionuclide fate and effects N83-27486
Statistical and theoretical research N83-27487
EDGES
Detectability of defects by thermal non-destructive testing
[AERE-R-10802] N83-27250
EFFICIENCY
The use of vortex generators as inexpensive compressor casing treatment N83-26798
Research options for the development of sensors to measure the thermal state of solid steel bodies
[DE83-007253] N83-27191
Increased efficiency of hydroelectric power
[DE82-905771] N83-27403
Design and development of a high-concentration photovoltaic concentration (2-d)
[DE82-008924] N83-27433
Intermediate photovoltaic system application experiment operational performance report for Beverly High School, Beverly, Massachusetts for August 1982, volume 12
[DE83-007092] N83-27460
Ammonia-air fuel cell power plant systems analysis
[DE82-018914] N83-27464
Efficiency considerations for C programs on a VAX (trademark) 11/780
[AD-A125209] N83-27617
Review of induction linacs N83-27769
Ion source development and injector design for Zebra N83-27776
EFFLUENTS
Dew points of hot gases from coal-gasification processes
[DE82-016337] N83-26964
Solid wastes: Mobilization, fate and effects N83-27485
Statistical and theoretical research N83-27487
EGYPT
Libya, Algeria and Egypt: Crude oil potential from known deposits
[DE82-018578] N83-27334
EIGENVALUES
Some remarks on the continuation method of Leray-Schauder-Rabinowitz and the method of monotone iterations
[AD-A125267] N83-27645
Eigenvalue problem for Hermitian matrices with time-reversal symmetry
[DE83-005629] N83-27695

EJECTORS
Highlights of an ejector analysis N83-26804
Advances in ejector technology: A tribute to Hans von Ohain's vision N83-26805
A one-dimensional procedure for estimating the performance of ejector nozzles N83-26806
Model aerodynamic test results for a refined actuated inlet ejector nozzle at simulated takeoff and cruise conditions
[NASA-CR-168051] N83-26816

ELASTIC PROPERTIES
A class of biharmonic end-striping problems arising in elasticity and Stokes flow
[AD-A125305] N83-27653
Elastic constants of plastic crystals by Schaefer-Bergmann scattering: Crystalline cyclohexane and deuteromethane
[DE82-016660] N83-27885

ELASTIC SCATTERING
Folding models for elastic and inelastic scattering
[DE82-017426] N83-27819
Beam broadening in a strongly scattering target in the analytical electron microscope
[DE82-014085] N83-27825
Note on the elastic-scattering of few-MeV neutrons from elemental calcium
[DE82-019476] N83-27827
Diffractive interactions of hadrons at high energies
[DE82-019463] N83-27830
LAMPF: Proposal status and summaries
[DE82-015887] N83-27841

ELASTIC WAVES
The Bojarski-Lewis identify for elastic wave scattering N83-26809
Fundamental study of dense-fluid detonation
[AD-A125300] N83-27156
Cavity loading associated with high-current RF linacs N83-27754

ELASTOPLASTICITY
Shock-wave response of titanium sunhydride-potassium perchlorate
[DE82-016739] N83-27043
A study of elastic-plastic fracture parameters through the thickness of fracture toughness specimens using silicone-rubber crack impressions
[AERE-R-10815] N83-27280

ELECTRIC ARCS
Anode phenomena in vacuum arcs
[DE83-007181] N83-27141

ELECTRIC CHARGE
Stopping of swift ions in condensed matter: The theory of effective charge N83-27714
Effective charge of energetic ions in metals N83-27715
Charge state distribution of light ions at glancing collision N83-27719
Interactions of fast molecular ions traversing thin foils: The contribution from field-ionized Rydberg atoms in measurements on Convoy electrons N83-27720

ELECTRIC CONTACTS
Thermal conductance of pressed contacts at liquid helium temperatures
[NASA-TM-84365] N83-27876

ELECTRIC DISCHARGES
Changes in the states of aggregation on the electrodes during condensed discharges
[AD-A124780] N83-27128
Experiments on focusing systems in laser initiated discharge channels
[AD-A125296] N83-27207

ELECTRIC ENERGY STORAGE
Evaluation program for secondary spacecraft cells. Cycle life test
[NASA-CR-172679] N83-27351
Evaluation program for secondary spacecraft cells. Cycle life test
[NASA-CR-172680] N83-27352

ELECTRIC FIELDS
Reduction of AM radio interference through control of radiated electric field N83-27106
Relationships between field-aligned currents, electric fields and particle precipitation as observed by dynamics Explorer-2
[NASA-TM-85025] N83-27519
Post coupler studies for Alvarez tanks to be used for high power or variable energy N83-27763
Variable-energy drift-tube linacs N83-27764
Recent work on collective accelerators N83-27771
An analytical solution for the electrical properties of a Radio Frequency Quadrupole (RFQ) with simple vanes N83-27785
New formulation of the RFQ radial matching section N83-27789

ELECTRIC FILTERS
Performance surfaces of adaptive predictors structures
[DE82-020090] N83-27663

ELECTRIC GENERATORS
Development of variable-shaft-speed alternator
[DE82-012334] N83-27139
Small geothermal power plant. Portable turbine generator N83-27380
Wind-systems technical notes: 1981
[DE83-007202] N83-27384
Evaluation of biomass systems for electricity generation
[DE82-901665] N83-27436

ELECTRIC MOTOR VEHICLES
Research, development, and demonstration of lead-acid batteries for electric vehicle propulsion
[DE82-016225] N83-27467

ELECTRIC POTENTIAL
LANDSAT-D flight segment operations manual. Appendix A: Coefficients/calibration data
[E83-10287] N83-27289
Low-cost, sprayed CdTe solar-cell research
[DE83-007275] N83-27392
Effects of core nonuniformities on the performance of MHD generators
[DE83-005426] N83-27447
Cadmium sulfide/copper ternary heterojunction cell research
[DE83-000997] N83-27451
Ion source development and injector design for Zebra N83-27776
The image displacement instability in radial line accelerators N83-27777
Automated C-V and Y omega meson curves for MOS device analysis
[DE82-014268] N83-27886

ELECTRIC POWER
A new look at turbulence experienced by a rotating wind turbine
[DE83-007044] N83-27383

ELECTRIC POWER PLANTS
The plasma powerplant N83-26927
Welding practices in fossil-fired units N83-27219
Wellhead power production with a rotary separator turbine (RP 1196) N83-27376
Overview of worldwide geothermal power development N83-27379
Intermediate photovoltaic system application experiment operational performance. Executive summary for Newman Power Station, El Paso, Texas
[DE82-019965] N83-27407
Transformation of energy-related pollutants N83-27489

ELECTRIC POWER SUPPLIES
Electrical system waveform distortion N83-27107
Intermediate photovoltaic system application experiment operational performance report, for April 1982. Volume 2: For Mississippi County Community College, Blytheville, Arkansas
[DE83-006446] N83-27439
Intermediate photovoltaic system application experiment operational performance report, for September 1982. Volume 5: For Oklahoma Center for Science and Arts
[DE83-006448] N83-27440
Intermediate photovoltaic system application experiment operational performance report, for October 1982. Volume 16: For Lovington Square Shopping Center, Lovington, New Mexico
[DE83-006447] N83-27441
Intermediate photovoltaic system application experiment operational performance report. Volume 16: For Newman Power Station, El Paso, Texas for October 1982
[DE83-006445] N83-27442

ELECTRIC SWITCHES
Switching devices
[AD-A124801] N83-27129

ELECTRICAL FAULTS
Final materials, processes, and testing progress report for residential and non-residential applications
[DE82-017285] N83-27427

ELECTRICAL MEASUREMENT
Fractional charge search
[DE82-018607] N83-27194

ELECTRICAL PROPERTIES
Intercomparison of water triple point cells and standard platinum resistance thermometers
[DE83-005971] N83-27196
Silicon MIS/inversion-layer solar cells
[DE83-005422] N83-27453
An analytical solution for the electrical properties of a Radio Frequency Quadrupole (RFQ) with simple vanes N83-27785

ELECTRICAL RESISTIVITY
The rare earth sulfides R2S/sub 3-x/(R = Sc, Er and Lu) as high temperature thermoelectric elements
[DE82-016382] N83-27396

ELECTRO-OPTICS
Cross correlation analysis to determine the environmental parameters correlated with electro-optical system performance
[AD-A124886] N83-27544

ELECTROCATALYSTS
Zirconium carbide as an electrocatalyst for the chromous-chromic redox couple
[NASA-CASE-LEW-13246-1] N83-27344

ELECTROCHEMICAL CELLS
Evaluation program for secondary spacecraft cells. Cycle life test
[NASA-CR-172679] N83-27351
Evaluation program for secondary spacecraft cells. Cycle life test
[NASA-CR-172680] N83-27352

ELECTROCHEMICAL OXIDATION
Development of a biochemical process for production of alcohol fuel from peat
[DE82-016692] N83-27039

ELECTROCHEMISTRY
Preparation, characterization, physical testing and performance of fluorocarbon membranes and separators
[NASA-CR-167880] N83-26936
Electrochemical studies at carbon black paste electrodes containing cupric chloride additive
[AD-A125276] N83-26942
Convolution techniques in analytical electrochemistry
[DE82-018531] N83-26954
Hydrogen transport in and through niobium
[DE82-017214] N83-26980
Ammonia-air fuel cell power plant systems analysis
[DE82-018914:] N83-27464
Status of the DOE battery and electrochemical technology program, 3
[DE82-018912] N83-27469

ELECTRODES
Changes in the states of aggregation on the electrodes during condensed discharges
[AD-A124780] N83-27128

ELECTROLYSIS
Thermochemical processes for solar hydrogen production
[DE82-019575] N83-27047
End-Use Products of Fusion Energy: Alternatives and Their Implications to the Fusion Energy R and D Strategy
[PB83-151696] N83-27873

ELECTROLYTES
Development of photoelectrochemical cells based on compound semiconductors and nonaqueous electrolytes
[DE82-013700] N83-26968
Ammonia-air fuel cell power plant systems analysis
[DE82-018914:] N83-27464
Research, development, and demonstration of lead-acid batteries for electric vehicle propulsion
[DE82-016225] N83-27467

ELECTROMAGNETIC COMPATIBILITY
Basic EMC technology advancement for C3 systems. Volume 4A: Coupling of electromagnetic fields onto transmission lines. A comparison of the transmission of line model and the method of moments
[AD-A124861] N83-27102
Proceedings of the Lightning-Electromagnetic Compatibility Conference
[DE83-005707] N83-27104

ELECTROMAGNETIC FIELDS
Basic EMC technology advancement for C3 systems. Volume 4A: Coupling of electromagnetic fields onto transmission lines. A comparison of the transmission of line model and the method of moments
[AD-A124861] N83-27102
On the numerical solution of some 2-D electromagnetic interface problems by the boundary collocation method
[AD-A125269] N83-27666
Measurement of model inter-digital H type linac N83-27786

ELECTROMAGNETIC INTERFERENCE
Conducted and radiated signatures of fluorescent lamp systems in C and I environments N83-27108
EMI measurements of lightning systems N83-27109

ELECTROMAGNETIC MEASUREMENT
Near-field measurement facility plans at Lewis Research Center N83-26897
Place of HgI2 energy-dispersive X-ray detectors
[DE82-017651] N83-27193

ELECTROMAGNETIC NOISE
Test operations procedures
[AD-A124797] N83-27092

ELECTROMAGNETIC PULSES
Sensitivity of electric explosive devices to electromagnetic pulses: An estimation for assessing hazards in connection with stray fields from an electromagnetic pulse stimulator
[FOA-C-20485-D1(D4)] N83-27056
Effect of frequency-dependent soil parameters on reflection coefficients
[AD-A124798] N83-27091
ELECTROMAGNETIC RADIATION
Pushbroom radiometry and its potential using large space antennas N83-26860
Molecular beam studies of primary photochemical processes
[DE83-006190] N83-26946
Effect of frequency-dependent soil parameters on reflection coefficients
[AD-A124798] N83-27091
Biological effects of radio-frequency radiation N83-27105
Reduction of AM radio interference through control of radiated electric field N83-27106
USSR report: Life sciences. Effects of nonionizing electromagnetic radiation, no. 9
[JPRS-83601] N83-27572
Effect of decimeter waves on functional state of cardiovascular system, some biochemical and immunological parameters of patients recovering from myocardial infarction N83-27573
Morphological effects of chronic action of SHF field on nervous system of mice N83-27574
ELECTROMECHANICS
Electrostatically figured membrane reflectors: An overview N83-26878
ELECTRON ACCELERATORS
Evolution of the racetrack microtron control system N83-27760
The RF system of the photon factory injector linac N83-27761
Beam instabilities in race track microtrons N83-27773
A modular system for the control of complex accelerators using portable software N83-27781
High-average-power electron accelerators for generating gigawatt microwave pulses
[DE83-006808] N83-27821
ELECTRON AVALANCHE
CID thermionic gun system N83-27739
ELECTRON BEAM WELDING
Welding technology for energy conversion N83-27216
Welding technologies and materials for energy applications in Japan N83-27218
Electron beam welding for heavy section steel plates N83-27229
ELECTRON BEAMS
Development and application of fully-automated EBIC techniques for solar-cell measurements
[DE82-014409] N83-27415
A beam cavity interaction computer code for linacs N83-27735
A FRQ concept using circular rods N83-27744
The 1981 Linear Accelerator Conference on Proton Beam Emittance Growth in Linac N83-27755
Experimental studies of electron beam focusing with solenoid lenses near the space charge limit N83-27772
Focussing considerations in the race track microtron and double-sided microtron N83-27774
Automatic beam-steering of the Mainz Microtron N83-27775
The image displacement instability in radial line accelerators N83-27777
The design of double sided microtrons N83-27778
Design of an electron beam spectral modification system N83-27779
Modeling beam-front dynamics at low gas pressures
[DE82-016636] N83-27842
ELECTRON BUNCHING
A beam cavity interaction computer code for linacs N83-27735
Computer simulation of longitudinal-transverse space charge effects in bunched beams N83-27751
Beam parameter measurements for the SLAC linear collider N83-27753
Longitudinal beam optimization of the Argonne superconducting heavy-ion liner accelerator N83-27780
Buncher section optimization of heavy ion RFQ linacs N83-27790
ELECTRON CAPTURE
Calculation of the equilibrium mean charge of helium ions N83-27717
ELECTRON DENSITY (CONCENTRATION)
Ionospheric irregularities and their potential impact on synthetic aperture radars
[AD-A124942] N83-27100
A local single particle self energy for the Hubbard model
[INPE-2736-PRE/316] N83-27810
ELECTRON DENSITY PROFILES
Use of the VHF signal of the Sirio satellite for ionospheric investigations N83-27533
ELECTRON EMISSION
Electron emission characteristics of tungsten alloys: Mee 492 --- for use in thermionic converters
[DE83-006774] N83-27006
ELECTRON GAS
The stopping power of an electron gas for slow ions N83-27708
ELECTRON GUNS
CID thermionic gun system N83-27739
ELECTRON MICROSCOPY
Substructure of a 16-8-2 GTA weld as observed through TEM N83-27224
Evaporated lithium-doped amorphous silicon solar cells
[DE82-018078] N83-27400
ELECTRON OPTICS
Automatic beam-steering of the Mainz Microtron N83-27775
ELECTRON PARAMAGNETIC RESONANCE
On space charge instabilities and emittance growth in RF linacs N83-27752
ELECTRON SCATTERING
Interaction of hydrogen molecular ions with thin foils. Part 1: Convoy electrons N83-27721
ELECTRON TRANSFER
Catalytic CO2 gasification of graphite vs. coal char
[DE82-016412] N83-26959
ELECTRON TRANSITIONS
Variational transition-state theory
[DE83-006003] N83-26973
Analysis of electronic desorption
[DE82-018591] N83-27832
Mechanisms of electronic description
[DE82-018590] N83-27887
ELECTRON TUNNELING
Variational transition-state theory
[DE83-006003] N83-26973
ELECTRONIC CONTROL
Electronic system for high power load control --- solar arrays
[NASA-CASE-NPO-15358-1] N83-27126
ELECTRONIC COUNTERMEASURES
Survivability of interdiction aircraft: Sensitivity to terrain following, command altitude, velocity and electronic counter measures
[AD-A124870] N83-26833
ELECTRONIC EQUIPMENT
Computer assistance for the design of electronic components
[DE82-008920] N83-27138
ELECTRONIC SPECTRA
Interaction of hydrogen molecular ions with thin foils. Part 3: Inner-shell ionization N83-27723
ELECTROPHYSIOLOGY
Morphological effects of chronic action of SHF field on nervous system of mice N83-27574
ELECTROPLATING
Plating wastes survey
[AD-A125230] N83-27480
ELECTROSLAG WELDING
The influence of flux composition on the chemistry and cleanliness of 2 1/4Cr-1Mo steel electroslag weld metal N83-27234
ELECTROSTATIC WAVES
Preaccelerator design and component development for the SNQ linear accelerator N83-27734
ELECTROSTATICS
Electrofluid dynamics: The role of Hans von Ohain N83-26788
Electrostatically figured membrane reflectors: An overview N83-26878
ELEMENTARY PARTICLE INTERACTIONS
Photon-photon collisions
[DE83-007011] N83-27813
ELEVONS
Heating measurements on Space Shuttle Orbiter models with differentially deflected elevons
[NASA-TM-84646] N83-27151
ELLIPSES
The analysis of residual stresses according to the Phi Psi Xi method with data compensation through ellipses
[NRC/CNR-TT-2061] N83-27257
ELLIPSOMETERS
Passive films, surface structure and stress corrosion and crevice corrosion susceptibility
[AD-A124879] N83-26995
ELLIPTICITY
Numerics of measuring residual stresses in near-surface layers by means of X-ray diffraction analysis. Part 1: Constant and inclined stress distribution
[NRC/CNR-TT-2060] N83-27258
ELONGATION
Elongational viscosity rheological parameter study
[AD-A125265] N83-27261
EMISSIVITY
Low emissivity and solar control coatings on architectural glass N83-27359
EMITTANCE
Computer simulation of longitudinal-transverse space charge effects in bunched beams N83-27751
On space charge instabilities and emittance growth in RF linacs N83-27752
Experimental studies of electron beam focusing with solenoid lenses near the space charge limit N83-27772
Ion source development and injector design for Zebra N83-27776
END-TO-END DATA SYSTEMS
Concepts for connectivity and interoperability of world space data networks: INPE proposal to CCSDS/Panel 3
[INPE-2722-PRE/307] N83-27088
ENERGETIC PARTICLES
Effective charge of energetic ions in metals N83-27715
Energetic-ion acceleration and transport in the upstream region of Jupiter: Voyager 1 and 2
[NASA-TM-85179] N83-27946
ENERGY BANDS
Electronic-energy-band structure of uranium hydride
[DE82-016393] N83-27884
ENERGY CONSERVATION
Improved analytical and numerical techniques for calculating explosions and implosions N83-26801
Field experiences underscore the importance of moisture control in energy-efficient homes
[DE83-901234] N83-27064
Load leveling on industrial refrigeration systems
[DE82-902079] N83-27066
Research options for the development of sensors to measure the thermal state of solid steel bodies
[DE83-007253] N83-27191
Household energy conservation: Strategies for behavioral research
[RAND/N-1909-DOE] N83-27349
An appraisal of evaluations of utility sponsored programs for residential energy conservation
[RAND-N-1925-DOE] N83-27350
International energy technology assessment: Atmospheric fluidized-bed combustion
[DE82-012430] N83-27404
Biomass-energy-technology program summary
[DE82-018926] N83-27426
Testimony presented to Subcommittee on Energy Development and Applications, US House of Representatives. Hearings on renewable energy in the eighties: Needs for further research, development and demonstration
[DE82-017407] N83-27430
An overview of the Solar in Federal Buildings Demonstration Program (SFBP)
[DE83-005757] N83-27452
Economic evaluation of end-user conservation measures applied to buildings served by a proposed district-heating system
[DE82-016080] N83-27470
Putting renewable energy to work in cities
[DE82-017237] N83-27472
Energy future Santa Cruz. A citizens plan for energy self-reliance: Executive summary
[PB83-136978] N83-27474
Energy future Santa Cruz: A citizens' plan for energy self-reliance
[PB83-136960] N83-27475
Urban-waste program research and development 1978-1981: An overview
[DE82-019788] N83-27514
After energy price decontrol: The role of government conservation programs
[RAND/N-1903-DOE] N83-27922
ENERGY CONSUMPTION
Overview of fuel alcohol from agricultural crops with emphasis on the Tennessee Valley
[DE82-016932] N83-27050
Computer-aided analysis of energy consumption in ethanol-water distillation operations
[DE82-014333] N83-27413
ENERGY CONVERSION
Electrofluid dynamics: The role of Hans von Ohain N83-26788
Phase-change materials in masonry construction
[DE83-007227] N83-27061
Welding technology for energy conversion N83-27216

Explorator study of plasma arc jet shale conversion [DE82-009090] N83-27388
Biosolar hydrogen and oxygen production [DE82-017491] N83-27428

ENERGY CONVERSION EFFICIENCY
Development of photoelectrochemical cells based on compound semiconductors and nonaqueous electrolytes [DE82-013700] N83-26968
Develop and test fuel cell powered on-site integrated total energy system [NASA-CR-168021] N83-27348

ENERGY DISSIPATION
SAFE II: Large systems space plasma evaluation experiment N83-26903
Ray tracing in dissipative media [KGI-PREPRINT-060] N83-27112
Calorimeter for measuring ac magnetic losses in small samples [DE82-018167] N83-27192
Charge States and Dynamic Screening of Swift Ions in Solids [DE83-006799] N83-27697
Stopping powers of Zr, Pd, Cd, In and Pb for 6.5 MeV protons and mean excitation energies N83-27698
Geometrical effect on stopping power measurement (angle dependent energy loss) of 7 MeV protons N83-27699
Computer simulation of geometrical effects on the stopping power for 7 MeV protons N83-27700
Current stopping power analyses N83-27701
Inner-shell ionization and stopping power N83-27704
The stopping power of an electron gas for slow ions N83-27708
Anomalies in the thickness dependence of the energy loss of helium and nitrogen ions in very thin carbon foils N83-27710
Energy loss of heavy ions as a function of target thickness: Ne yields C N83-27711
Estimation of fluctuation in restricted energy loss N83-27712
Energy losses to surface plasmons by charged particles N83-27713
Stopping of swift ions in condensed matter: The theory of effective charge N83-27714
A beam cavity interaction computer code for linacs N83-27735
Longitudinal beam optimization of the Argonne superconducting heavy-ion liner accelerator N83-27780
Experimental studies on energy transport in a reversed field theta pinch [IPPJ-626] N83-27853

ENERGY DISTRIBUTION
Design of an electron beam spectral modification system N83-27779

ENERGY OF FORMATION
The pulsed proton prototype of a high current ion linac N83-27747
Beam dynamics in heavy ion induction linacs N83-27750

ENERGY POLICY
Geothermal energy and the state water project N83-27374

ENERGY REQUIREMENTS
Testimony presented to Subcommittee on Energy Development and Applications, US House of Representatives. Hearings on renewable energy in the eighties: Needs for further research, development and demonstration [DE82-017407] N83-27430
Putting renewable energy to work in cities [DE82-017237] N83-27472

ENERGY SOURCES
Putting renewable energy to work in cities [DE82-017237] N83-27472

ENERGY STORAGE
Nondestructive inspection and evaluation of composite-material flywheels [DE82-015379] N83-26930
Potential of composite materials in surface transportation applications [DE83-007218] N83-26931
Phase-change materials in masonry construction [DE83-007227] N83-27061
Aquifer thermal-energy-storage costs with a seasonal-chill source [DE83-006700] N83-27382
Flywheel energy-storage-and-conversion system for photovoltaic applications [DE82-017128] N83-27437
Geotechnical factors and guidelines for storage of compressed air in solution-mined salt cavities [DE82-017611] N83-27465
Research support for plasma diagnostic on Elmo Bumpy Torus. Observations of EBT ring geometry by means of diamagnetic field measurements using a compensated ferromagnetic resonance magnetometer, and a preliminary numerical study of EBT flux penetration dynamics [DE83-007883] N83-27864

ENERGY TECHNOLOGY
International Conference on Welding Technology for Energy Applications [DE83-006404] N83-27215
Welding technology for energy conversion N83-27216
Welding technologies and materials for energy applications in Japan N83-27218
Biomass-energy-technology program summary [DE82-018926] N83-27426
Renewable energy technology handbook for military engineers [DE82-017689] N83-27431
Status of the DOE battery and electrochemical technology program, 3 [DE82-018912] N83-27469
Energy future Santa Cruz: A citizens' plan for energy self-reliance [PB83-136960] N83-27475
National Energy Software Center: Compilation of program abstracts [DE83-001550] N83-27630

ENERGY TRANSFER
Highlights of an ejector analysis N83-26804

ENGINE DESIGN
The Cummins advanced turbocompound diesel engine evaluation [NASA-CR-168042] N83-27923

ENGINE INLETS
Dynamic distortion in a short s-shaped subsonic diffuser with flow separation — Lewis 8 by 6 foot Supersonic Wind Tunnel [NASA-TM-84312] N83-26838
Dynamic response of ramjet inlets to downstream perturbations [AD-A125295] N83-27157

ENGINE PARTS
Test results and description of a 1-kW free-piston Stirling engine with a dashpot load [NASA-TM-83407] N83-27346

ENGINE TESTS
Automotive Stirling Engine Development Program [NASA-CR-168074] N83-27925

ENGINEERING DRAWINGS
Solar-assisted water-source heat pump [DE83-006023] N83-27457

ENGINEERING MANAGEMENT
The servicing of complex NC manufacturing systems — numerical control (NC) [PNR-90153] N83-27069

ENTHALPY
Effects of non-constant enthalpy addition on fan-nozzle combinations N83-26807
Thermophysical properties of coal liquids [DE82-013366] N83-26967
Thermodynamics of organic compounds [AD-A125022] N83-27895

ENTRAINMENT
Turbulence models; a lecture course [CFD/82/4-REV] N83-27180
Further studies on developing technology for indirect liquefaction [DE82-017677] N83-27406

ENTROPY
Mixing of compressible fluid with application to ejector thrusters N83-26803

ENVELOPES
On space charge instabilities and emittance growth in RF linacs N83-27752

ENVIRONMENT EFFECTS
Status of alcohol fuels utilization technology for highway transportation: A 1981 perspective. Volume 2: Compression-ignition engines [DE83-008127] N83-27036
Overview of fuel alcohol from agricultural crops with emphasis on the Tennessee Valley [DE82-016932] N83-27050
Pacific Northwest Laboratory report to the DOE Office of Energy Research. Part 2: Environmental sciences [DE83-007586] N83-27481
Marine research N83-27483
Radionuclide fate and effects N83-27486
Statistical and theoretical research N83-27487
Environmental safety and health requirements. Intermediate level skills training program [DE82-013800] N83-27503
Fluidized-bed combustion: A review of environmental aspects [DE82-021238] N83-27506
Implications of emerging environmental-control technologies for air-pollution regulations [DE83-005901] N83-27508
ARIS: Acid Rain Information System [DE83-007026] N83-27512
Low-level radioactive waste disposal. Study of a conceptual nuclear energy center at Green River, Utah [DE83-006835] N83-27844

ENVIRONMENT PROTECTION
Use of DOE/RECON in environmental protection [DE82-017506] N83-27499

ENVIRONMENT SIMULATION
The sensitivity of numerically simulated climates to land-surface boundary conditions [NASA-TM-83985] N83-27536

ENVIRONMENTAL CONTROL
Prediction of natural convection flow pattern in low-aspect ratio enclosures [AD-A124995] N83-27161

ENVIRONMENTAL MONITORING
Monitoring tropical vegetation succession with LANDSAT data [E83-10306] N83-27296
Monitoring land degradation in southern Tunisia: A test of LANDSAT imagery and digital data [E83-10320] N83-27308
Satellite monitoring of vegetation and geology in semi-arid environments — Tanzania [E83-10343] N83-27318

ENVIRONMENTAL TESTS
Slow crack growth in spinel in water [NASA-TM-85644] N83-27017

ENVIRONMENTS
Speech intelligibility in closed large scale environments [FUB-24-1982] N83-27123

EPOXY MATRIX COMPOSITES
A study of the stress wave factor technique for the characterization of composite materials [NASA-CR-3670] N83-27248

EPOXY RESINS
Ultrasonic mixing of epoxy curing agents [NASA-TM-85643] N83-27018
Fabrication of low-cost Mod-OA wood composite wind turbine blades [NASA-TM-83323] N83-27347
The simulation of a passive solar energy system [AD-A124900] N83-27354

EQUATIONS OF MOTION
Atomistic nonequilibrium computer simulations [DE82-017551] N83-27831

EQUATIONS OF STATE
Degradation of a laser beam by a turbulent jet N83-26799

EQUATORIAL ELECTROJET
Equatorial electrojet movements at Huancayo and Eusebio (Fortaleza) on selected quiet days [INPE-2740-PRE/319] N83-27521

EQUATORIAL REGIONS
Ionospheric irregularities and their potential impact on synthetic aperture radars [AD-A124942] N83-27100

EQUIPMENT SPECIFICATIONS
Creep-feed grinding: A modern variant of the plane surface grinding process [PNR-90163] N83-27074

ERBIUM COMPOUNDS
The rare earth sulfides R2S/sub 3-x/(R = Sc, Er and Lu) as high temperature thermoelectric elements [DE82-016382] N83-27396

ERGODIC PROCESS
Periodic renewal theory [CTH-MATH-1983-5] N83-27675

EROSION
Monitoring land degradation in southern Tunisia: A test of LANDSAT imagery and digital data [E83-10320] N83-27308

ERROR ANALYSIS
Error analysis and prevention of cosmic ion-induced soft errors in static CMOS RAMS [DE82-018967] N83-27610
The post processing approach in the finite element method. Part 2: The calculation of stress intensity factors [AD-A125040] N83-27661
Evaluation of the detection capacity of methods of monitoring data reliability [PNR-90160] N83-27677
Automatic test generation using a matrix model of digital systems [DE82-009988] N83-27693
Determining velocities by propagation [AD-A124889] N83-27849

ERROR CORRECTING CODES
Performance of sequentially decoded long constraint length codes for a satellite communications link in a scintillated channel
[AD-A124814] N83-27093
Decoding and synchronization of error correcting codes
[ENST-E-83001] N83-27113
Spelling correction in user interfaces
[AD-A125208] N83-27906
ERROR DETECTION CODES
Evaluation of the detection capacity of methods of monitoring data reliability
[PNR-90160] N83-27677
ERROR FUNCTIONS
Papers on techniques of program design
[ISSN-0208-5658] N83-27613
Contour-based motion estimation
[AD-A124812] N83-27848
ERRORS
High-gain error actuated flight control systems for continuous linear multivariable plants
[AD-A124871] N83-26848
Analysis of streak-camera measurement errors caused by misorientation of the camera slit with recording direction
[DE83-005970] N83-27197
ESTIMATES
Restoration of pulse position modulated signal in a high noise environment
[AD-A124902] N83-27099
Estimation of fluctuation in restricted energy loss N83-27712
ESTIMATING
Establishment of a center of excellence for applied mathematical and statistical research
[E83-10307] N83-27297
Estimating aircrew fatigue: A technique with application to airlift operations
[AD-A125319] N83-27594
Motion estimation based on multiple local constraints and nonlinear smoothing
[AD-A124838] N83-27640
Multiple model adaptive estimation for space-time point process observations
[AD-A124827] N83-27641
A prony methody for noisy data: Choosing the signal components and selecting the order in exponential signal models
[AD-A124897] N83-27646
Existence of unbiased covariance components estimators
[AD-A125299] N83-27650
Identifiabilty and estimation in random translations of marked point processes
[AD-A125313] N83-27652
Optimal smoothing and estimation for hybrid state processes
[AD-A124907] N83-27683
Sufficient statistics for decentralized estimation
[AD-A124941] N83-27689
Calculation of calorific value of coal/char from its ultimate analysis
[DE82-012879] N83-27899
ETCHING
Quantitative analysis of phosphosilicate glass films on silicon wafers
[DE82-017642] N83-26953
Aluminum nitride thin film and composite bulk wave resonators
[DE82-019303] N83-27135
ETHYL ALCOHOL
Computer-aided analysis of energy consumption in ethanol-water distillation operations
[DE82-014333] N83-27413
EULER EQUATIONS OF MOTION
Boundary conditions for suppressing rapidly moving components in hyperbolic systems. 2: An example
[AD-A120963] N83-27165
EULER-LAGRANGE EQUATION
Atomistic nonequilibrium computer simulations
[DE82-017551] N83-27831
EVALUATION
Spectral analysis with an exponential window iterative method: The performance of the signal frequency evaluation — voice signal processing
[FUB-15-1982] N83-27116
A study of multivariate statistical analysis techniques for computer performance evaluation
[AD-A124899] N83-27681
Automated C-V and Y omega meson curves for MOS device analysis
[DE82-014268] N83-27886
EVAPORATION
Flash evaporation from turbulent water jets
[DE83-007311] N83-27168
EVAPOTRANSPIRATION
Assessing solar energy and water use efficiencies in winter wheat
[E83-10329] N83-27313
EXCAVATION
Small hydroelectric power plant for Aztec, New Mexico
[DE82-903957] N83-27432
EXCIMER LASERS
Investigation of the dynamics of electronically excited states after excitation with an excimer laser
[MPIS-14/1982] N83-27209
EXCITATION
The development of a reduced-order functional representation of an alternator-rectifier excitation system aut 01Chen-Chen
[DE83-006437] N83-27133
Stopping powers of Zr, Pd, Cd, In and Pb for 6.5 MeV protons and mean excitation energies N83-27698
Mean excitation energies for use in Bethe's stopping-power formula N83-27703
Inner-shell ionization and stopping power N83-27704
Mechanisms of electronic description
[DE82-018590] N83-27887
EXERCISE PHYSIOLOGY
Sleep deprivation depresses thermoregulatory responses to physical exercise
[AD-A125062] N83-27581
Recovery from short term intense exercise: its relation to capillary supply and lactate release
[AD-A124965] N83-27584
Angular specificity and test mode specificity of isometric and isokinetic strength training
[AD-A124976] N83-27585
EXHAUST EMISSION
Status, trends and implications of carbon fiber material use
[PB83-147751] N83-26934
Soot formation in synthetic-fuel droplets
[DE82-018420] N83-26958
Proceedings of the Fourth International Symposium on Coal-Slurry Combustion, volume 3 — conferences
[DE82-016351] N83-26982
An investigation of the effectiveness of smoke suppressant fuel additives for turbojet applications
[AD-A125025] N83-27034
Kinetic mechanism for fuel-nitrogen conversion in lean to rich flames
[DE82-905467] N83-27356
Transformation of energy-related pollutants N83-27489
Oil shale fugitive air emissions N83-27495
EXHAUST GASES
Status of alcohol fuels utilization technology for highway transportation: A 1981 perspective. Volume 2: Compression-ignition engines
[DE83-008127] N83-27036
High-temperature turbine-technology program. Phase 2: Technology test and support studies. Design and development of a regeneratively fuel cooled high temperature gas turbine combustor for operation on low Btu gas
[DE83-007342] N83-27241
The Cummins advanced turbocompound diesel engine evaluation
[NASA-CR-168042] N83-27923
EXHAUST NOZZLES
Thrust performance of a variable-geometry, divergent exhaust nozzle on a turbojet engine at altitude
[NASA-TP-2171] N83-26839
EXISTENCE THEOREMS
Existence and convergence of random set distributions
[CTH-MATH-1983-3] N83-27691
EXOBIOLOGY
Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 246)
[NASA-SP-7011(246)] N83-27579
The extinction of starlight at wavelengths near 2200A. The 2.8 to 3.6 micron spectra of micro-organisms with varying H2O-ice content
[PREPRINT-85] N83-27940
The 2.8 to 3.6 micron spectra of micro-organisms with varying H2O-ice content N83-27942
Interstellar proteins and the discovery of a new interstellar absorption feature at lambda = 2800A
[PREPRINT-86] N83-27944
EXPANSION
Sensitivity analysis for premixed, laminar, steady-state flames
[AD-A123866] N83-26938
EXPERIMENT DESIGN
LAMPF: Proposal status and summaries
[DE82-015887] N83-27841
Simple method of sheet plasma production in lower pressure
[IPPJ-628] N83-27857
EXPERIMENTATION
The need for space flight experiments and testing in the development of large space antenna systems technology N83-26898
EXPLOSIVE DEVICES
Sensitivity of electric explosive devices to electromagnetic pulses: An estimation for assessing hazards in connection with stray fields from an electromagnetic pulse stimulator
[FOA-C-20485-D1(D4)] N83-27056
EXPLOSIVES
Effects of particle characteristics on performance of RRSK PETN
[DE82-018553] N83-27044
Thermochemistry of mixed explosives
[DE82-012149] N83-27045
Jet penetration of inerts and explosives
[DE83-003746] N83-27052
Fundamental study of dense-fluid detonation
[AD-A125300] N83-27156
Properties of three-dimensional energetic solids and molecular crystals
[AD-A124944] N83-27880
EXPONENTIAL FUNCTIONS
MTBF confidence bounds based on MIL-STD-781C fixed-length test results N83-26813
A prony methody for noisy data: Choosing the signal components and selecting the order in exponential signal models
[AD-A124897] N83-27646
EXPOSURE
Microcircuit radiation effects databank
[NASA-TM-85346] N83-27903
EXTENSIONS
Extension of interpolation theorems for weighted Sobolev spaces
[CTH-MATH-1983-2] N83-27673
EXTRACTION
Two papers on circuit extraction
[AD-A125304] N83-27130
Design of an electron beam spectral modification system N83-27779
EXTRAPOLATION
Sensitivity analysis for premixed, laminar, steady-state flames
[AD-A123866] N83-26938
EXTRAVEHICULAR MOBILITY UNITS
Manned assembly of space structures N83-26869
EXTREMUM VALUES
Contrasts between wet and dry periods within the 1981 rainy season in northeast Brazil
[INPE-2728-PRE/310] N83-27539

F

FABRICATION
Advances in structural concepts N83-26868
Research options for the development of sensors to measure the thermal state of solid steel bodies
[DE83-007253] N83-27191
Effect of joint design and fabrication limitations on tube-to-tubesheet welding N83-27235
Dissimilar weld failure analysis and development program N83-27239
Downhole steam-generator study. Volume 1: Conception and feasibilty evaluation
[DE82-018348] N83-27424
Analysis, design, fabrication, and testing of moderately concentrating solar-energy collectors
[DE83-006065] N83-27445
Cost/design study and fabrication/testing of a 300-W gas-recombination device for utility lead-acid cells
[DE82-019800] N83-27468
Blake Plateau: Mid-depth and bottom current measurements
[PB83-144519] N83-27567
FACILITIES
Terminal forecast reference notebook for Rhein Main AB, Germany
[AD-A124984] N83-27547
FACTOR ANALYSIS
Test operations procedures
[AD-A124797] N83-27092
FADING
Simulation of multipath propagation on digital radiolinks
[FOA-A-30032-E2] N83-27111
Mathematical modeling of black-and-white chromogenic image stability
[AD-A125248] N83-27186

FAILURE ANALYSIS
Analysis of a failed spent-char transfer line from the IGT HYGAS coal-gasification pilot plant
[DE82-014906] N83-26947
Thermo-mechanical and thermal behavior of high-temperature structural materials
[AD-A125242] N83-27026
Joint opening nonlinear mechanism: Interface smeared crack model
[PB83-149195] N83-27084
Damage accumulation and failure criteria in 'creep brittle' ferritic weldment structures N83-27238
Dissimilar weld failure analysis and development program N83-27239
A method for testing components in the high acceleration frequency range
[TULEA-1981-16] N83-27269
Composite beams from a statistical point of view
[TULEA-1982-05-T] N83-27273
Final materials, processes, and testing progress report for residential and non-residential applications
[DE82-017265] N83-27427
Acoustic emissions during deformation of intact and jointed welded tuff
[DE82-016346] N83-27805

FAR FIELDS
A survey of near-field testing methods for large aperture antennas and future trends N83-26896
Near-field measurement facility plans at Lewis Research Center N83-26897

FARADAY EFFECT
Comparison of neutron and heavy-ion damage in a stable austenite
[DE82-017369] N83-27009

FARM CROPS
Development of techniques for producing static strata maps and development of photointerpretive methods based on multitemporal LANDSAT data
[E83-10081] N83-27284

FARMLANDS
Effects of autocorrelation upon LANDSAT classification accuracy — Richmond, Virginia and Denver, Colorado
[E83-10328] N83-27312

FAST FOURIER TRANSFORMATIONS
Numerical treatment of Doppler radar signals — airport radar, video data
[ENST-E-82014] N83-27114

FAST NEUTRONS
Fast-neutron total and scattering cross sections of elemental palladium
[DE82-019475] N83-27001

FATIGUE (BIOLOGY)
Comparative analysis of positive and negative lateral acceleration on isometric fatigue
[AD-A124752] N83-27587
Estimating aircrew fatigue: A technique with application to airlift operations
[AD-A125319] N83-27594

FATIGUE (MATERIALS)
Assessment of the quality of bearing steel from its inclusion content
[BLL-M-26906-(5828.4)] N83-26991
Mechanisms of damage accumulation in time-dependent cyclic deformation
[DE83-000993] N83-27002
Response of bainitic 2 1/4 Cr-1 Mo steel to creep-fatigue loadings at 482 deg C
[DE82-017445] N83-27011

FATIGUE LIFE
Fatigue crack growth from blunt notches
[GKSS-82/E/44] N83-27276

FATIGUE TESTS
Compression and compression fatigue testing of composite laminates
[NASA-CR-168023] N83-26928
Slow crack growth in spinel in water
[NASA-TM-85644] N83-27017

FEASIBILITY ANALYSIS
Audio direct broadcast satellites N83-26857
Gasification in pulverized coal flames. Investigation of pulverized coal-combustors and gasifiers: Multiple sub-reactor model and experimental results, part 2
[DE82-013001] N83-26965
Local structure of feasible sets in nonlinear programming. Part 1: Regularity
[AD-A125244] N83-27657
Feasibility study of three-dimensional holographic interferometry for aerodynamics
[NASA-CR-166483] N83-27845

FEDERAL BUDGETS
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984 N83-27919
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984: National Aeronautics and Space Administration N83-27920
NASA authorization for fiscal year 1984
[GPO-19-200] N83-27921

FEED SYSTEMS
Surface grinding at high power avoiding thermal edge zone damage
[PNR-90161] N83-27072
Creep feed (single path) and conventional (multi-path) grinding - surface structure and comparison
[PNR-90162] N83-27073
Pneumatic conveying of coal and coal-limestone mixtures as applied to atmospheric fluidized-bed combustion
[DE82-015694] N83-27243

FEEDBACK CONTROL
High-gain error actuated flight control systems for continuous linear multivariable plants
[AD-A124871] N83-26848
Application of modern control theory for building structures
[PB83-144147] N83-27080
Multiple model adaptive estimation for space-time point process observations
[AD-A124827] N83-27641

FEEDFORWARD CONTROL
Dead beat filling and feedforward RF control for the spallation neutron source SNQ N83-27733

FERMENTATION
Development of a biochemical process for production of alcohol fuel from peat
[DE82-016692] N83-27039

FERRITIC STAINLESS STEELS
Creep characteristics of butt welded joints for thick 2 1/4Cr-1Mo pipework and pressure vessels N83-27233
Damage accumulation and failure criteria in 'creep brittle' ferritic weldment structures N83-27238

FIBER OPTICS
The phase noise of semiconductor lasers in single mode optical fiber heterodyne systems
[ENST-E-82013] N83-27211

FIBER REINFORCED COMPOSITES
Fiber reinforced composite materials
[TULEA-1981-02] N83-26933

FIELD EFFECT TRANSISTORS
Electronic system for high power load control — solar arrays
[NASA-CASE-NPO-15358-1] N83-27126
Design of active impedance microwave monolithic circuits with a GaAs substrate
[ENST-E-82012] N83-27143
Modulator reliability and bandwidth improvement: Replacing tetrodes with MOSFETs N83-27783

FIELD OF VIEW
Simulated monitor display for CCTV
[DE82-017020] N83-27552

FIELD STRENGTH
Design of REC permanent magnet quadrupoles taking into account B, H non-linearity N83-27770
A 750 keV RFQ linac for the AGS polarized proton program N83-27788

FIELD THEORY (PHYSICS)
A finite-particle-number approach to physics
[DE83-007014] N83-27791

FIGHTER AIRCRAFT
Effects of varying podded nacelle-nozzle installations on transonic aeropropulsive characteristics of a supersonic fighter aircraft
[NASA-TP-2120] N83-26821
Lateral flying qualities of highly augmented fighter aircraft, volume 1
[AD-A118070] N83-26835
Pilot human factors in stall/spin accidents of supersonic fighter aircraft
[NASA-TM-84348] N83-26846

FILE MAINTENANCE (COMPUTERS)
Fast-neutron scattering cross sections of elemental silver
[DE82-019477] N83-27883
Concepts evaluation model V input-data system
[AD-A124891] N83-27908

FILM COOLING
Curved film cooling admission tube
[NASA-CASE-LEW-13174-1] N83-27144

FILM THICKNESS
Preparation, characterization, physical testing and performance of fluorocarbon membranes and separators
[NASA-CR-167880] N83-26936

FINANCIAL MANAGEMENT
Small computers in the federal government: Management is needed to realize potential and prevent problems
[GAO/AFMD-83-36] N83-27604

FINITE DIFFERENCE THEORY
Computational fluid dynamics: An engineering tool? N83-26796
A comparison of the finite beat conduction equation with temperature dependent conductivity
[AD-A124918] N83-27647
The stability of one-step schemes for first-order two-point boundary value problems
[AD-A125240] N83-27659

FINITE ELEMENT METHOD
Finite element program for calculating flows in turbomachines with results for NASA task-1 compressor
[AD-A124987] N83-26841
MARIAH: A finite-element computer program for incompressible porous-flow problems, user's manual
[DE83-006847] N83-27167
Finite element approximation of the nonstationary Navier-Stokes problem. Part 2: Stability of solutions and error estimates uniform in time
[PREPRINT-558-PT-2] N83-27179
Potential of minicomputer/array-processor system for nonlinear finite-element analysis
[NASA-TM-84566] N83-27259
Analysis of progressive collapse of complex structures
[AD-A125266] N83-27260
Optimization of three dimensional combined truss/frame structures
[AD-A124988] N83-27263
A finite element analysis of the creep response of lumbar intervertebral joints in the Rhesus monkey
[AD-A124740] N83-27570
A categorized theory of bilinear systems over a ring
[CSIR-TWISK-264] N83-27638
Numerical dynamic analysis of structures by the finite dynamic element method
[AD-A125213] N83-27642
A comparison of the finite beat conduction equation with temperature dependent conductivity
[AD-A124918] N83-27647
The post-processing approach in the finite element method. Part 1: Calculation of displacements, stresses, and other higher derivatives of the displacements
[AD-A125039] N83-27660
The post-processing approach in the finite element method. Part 2: The calculation of stress intensity factors
[AD-A125040] N83-27661
The lumped mass finite element method for a parabolic problem
[CTH-MATH-1983-1] N83-27672
Finite element methods for linear hyberbolic problems
[CTH-MATH-1983-4] N83-27674

FISHES
Large-scale operations management test of use of the White Amur for control of problem aquatic plants. Part 4. Third year poststocking results. Volume 6. The water and sediment quality of Lake Conway, Florida
[AD-A124443] N83-27479

FITTING
Evaluation and performance of closed-circuit breathing apparatus
[DE82-015877] N83-27601

FLAME HOLDERS
Coaxial dump combustor investigations N83-26791

FLAME PROPAGATION
Analysis of flame propagation
[DE82-018582] N83-26948
Ignition and flame-propagation studies with adaptive numerical grids
[DE83-005462] N83-26976

FLAME SPECTROSCOPY
Flame optimization for the spectroscopic analysis of the chemiluminescence from lead oxide
[AD-A124825] N83-26937
Simultaneous multipoint measurements of density gradients and temperature in a flame
[DE83-007291] N83-26975

FLAME SPRAYING
Soot formation in synthetic-fuel droplets
[DE82-018420] N83-26958

FLAME TEMPERATURE
Simultaneous multipoint measurements of density gradients and temperature in a flame
[DE83-007291] N83-26975

FLAMES
Flame optimization for the spectroscopic analysis of the chemiluminescence from lead oxide
[AD-A124825] N83-26937
Ignition of flamelets behind incident shock waves and the transition to detonation
[AD-A125217] N83-26939
A calculation of wrinkled flames
[AD-A125258] N83-26943
Fundamental pyrolysis studies
[DE82-009808] N83-26969

FLASH LAMPS
Concentration solar-cell flash tester
[DE82-018551] N83-27195
FLAT PLATES
Flat-plate drag measurements with vortex generators in turbulent boundary layer
[NASA-CR-172125] N83-26814
FLEXIBLE SPACECRAFT
Reduced order control design for large space structures: A communication satellite example N83-26882
Practical approaches to the design of control systems for large space structures N83-26886
FLIGHT ALTITUDE
Survivability of interdiction aircraft: Sensitivity to terrain following, command altitude, velocity and electronic counter measures
[AD-A124870] N83-26833
FLIGHT CONTROL
Digital flight control system validation
[AD-A124506] N83-26847
High-gain error actuated flight control systems for continuous linear multivariable plants
[AD-A124871] N83-26848
Space flight experience with the Shuttle Orbiter control system N83-26900
FLIGHT CREWS
Estimating aircrew fatigue: A technique with application to airlift operations
[AD-A125319] N83-27594
FLIGHT HAZARDS
Aircraft lightning-induced voltage test technique developments
[NASA-CR-170403] N83-26829
FLIGHT SIMULATION
Research and analysis of head-directed area-of-interest visual system concepts
[NASA-CR-166480] N83-26849
FLIGHT TESTS
Space flight experience with the Shuttle Orbiter control system N83-26900
Integrated aerodynamic tests of the space shuttle vehicle during solid rocket booster separation at Mach 4.5 (IA193)
[AD-A125297] N83-26915
Aeronautical Knowledge (selected articles)
[AD-A123935] N83-26925
First flight test of Chinese electron rocket is successful N83-26926
FLORIDA
The classification of LANDSAT data for the Orlando, Florida, urban fringe area
[E83-10327] N83-27311
FLOW CHARACTERISTICS
Flash pyrolysis and hydropyrolysis of biomass
[DE82-015807] N83-26951
FLOW DISTRIBUTION
Improved analytical and numerical techniques for calculating explosions and implosions N83-26801
Interaction of multiple supersonic jets with a transonic flow field
[NASA-TM-84369] N83-27152
Dynamic response of ramjet inlets to downstream perturbations
[AD-A125295] N83-27157
Experimental investigation of the mixing of highly swirling flows
[AD-A125249] N83-27160
Prediction of natural convection flow pattern in low-aspect ratio enclosures
[AD-A124995] N83-27161
Critical flow data review and analysis
[DE82-902199] N83-27172
FLOW EQUATIONS
A mathematical model of the urban boundary layer --- atmospheric models
[TULEA-1982-09] N83-27515
FLOW MEASUREMENT
Observation and measurement of air flow over water waves
[NMI-R-122] N83-27145
Experimental investigation of jets in a cross flow --- turbulent flow
[KU-SFB-80/E/219] N83-27177
Bio-medical flow sensor --- intrvenous procedures
[NASA-CASE-MSC-18761-1] N83-27577
FLOW REGULATORS
Bio-medical flow sensor --- intrvenous procedures
[NASA-CASE-MSC-18761-1] N83-27577
FLOW STABILITY
Linearized stability of extreme shock profiles for systems of conservation laws with viscosity
[AD-A125256] N83-27159
Dynamics of three-dimensional disturbances in water table flow --- water waves
[TULEA-1982-36-T] N83-27175
Observations of turbulent spots on a water table
[TULEA-1982-039-T] N83-27176
FLOW VELOCITY
Electrofluid dynamics: The role of Hans von Ohain N83-26788
Boundary-layer transition on blunt, slender cones at hypersonic Mach numbers N83-26794
A note on the oscillation of cavities coupled to aerodynamic flows N83-26795
Oblique interactions of detonation waves with explosive/metal interfaces
[DE83-007119] N83-27038
Mass flow measurement of solids/gas stream using radiometric techniques
[DE82-017028] N83-27170
Critical flow data review and analysis
[DE82-902199] N83-27172
Effects of core nonuniformities on the performance of MHD generators
[DE83-005426] N83-27447
Solid wastes: Mobilization, fate and effects N83-27485
FLOW VISUALIZATION
On the large scale structure of turbulence in boundary layer and shear flows N83-26800
Observation and measurement of air flow over water waves
[NMI-R-122] N83-27145
Observations of turbulent spots on a water table
[TULEA-1982-039-T] N83-27176
FLUID DYNAMICS
Electrofluid dynamics: The role of Hans von Ohain N83-26788
Advances in ejector technology: A tribute to Hans von Ohain's vision N83-26805
Implicit upwind methods for the compressible Navier-Stokes equations
[NASA-TM-84364] N83-27149
FLUID FILTERS
Rapid, quantitative determination of bacteria in water --- adenosine triphosphate
[NASA-CASE-GSC-12158-1] N83-27569
FLUID FLOW
A note on the oscillation of cavities coupled to aerodynamic flows N83-26795
On the quantitative analysis of liquid flow in physiological tubes
[AD-A125284] N83-27155
DRAC: A user-friendly computer code for modeling transient thermohydraulic phenomena in solar-receiver tubing
[DE83-007091] N83-27458
FLUID MECHANICS
The numerical solution of pressure oscillations in an open cavity N83-26793
Ignition and flame-propagation studies with adaptive numerical grids
[DE83-005462] N83-26976
Demonstration of an a-c utility connected wind generator in a urban setting
[DE83-006896] N83-27387
Shear Alfven waves in Tokamaks
[DE83-007194] N83-27872
FLUIDICS
Fluidelastic instability in shell and tube heat exchangers: A framework for a prediction method
[DE83-007812] N83-27264
FLUIDIZED BED PROCESSORS
Autoignition of kerosene/oxygen mixtures in a fluidized bed
[DE82-016376] N83-26952
Fluidised-bed combustion. Initial results obtained in a 1-ft by 1-ft fluidised-bed combustor operating at pressures up to 20 ATM
[DE83-005956] N83-26974
Pneumatic conveying of coal and coal-limestone mixtures as applied to atmospheric fluidized-bed combustion
[DE82-015694] N83-27243
Development of a pressurized fluidized-bed biomass gsifier to produce substitute fuels
[DE82-013265] N83-27401
International energy technology assessment: Atmospheric fluidized-bed combustion
[DE82-012430] N83-27404
Further studies on developing technology for indirect liquefaction
[DE82-017677] N83-27406
Sulfur control in fluidized-bed combustors: Methodology for predicting the performance of limestone and dolomite sorbents
[DE83-007658] N83-27500
Fluidized-bed combustion: A review of environmental aspects
[DE82-021238] N83-27506
Development of a simplified optical technique for the simultaneous measurement of particle size distribution and velocity
[NASA-TP-2185] N83-27848
FLUIDS
How to solve materials and design problems in solar heating and cooling, Energy Technology Review No. 77
[DE83-006116] N83-27456
FLUORESCENCE
Investigation of the dynamics of electronically excited states after excitation with an excimer laser
[MPIS-14/1982] N83-27209
FLUORINE COMPOUNDS
The FO2 radical and Laser Magnetic Resonance (LMR) spectra in reactions of fluorine atoms
[MPIS-19/1982] N83-26985
FLUOROCARBONS
Preparation, characterization, physical testing and performance of fluorocarbon membranes and separators
[NASA-CR-167880] N83-26936
Is there any chlorine monoxide in the stratosphere?
[NASA-TM-85026] N83-27518
FLUX DENSITY
Nondestructive inspection and evaluation of composite-material flywheels
[DE82-015379] N83-26930
Aquifer thermal-energy-storage costs with a seasonal-chill source
[DE83-006700] N83-27382
FLUX PINNING
Fluxoid pinning by grain boundaries in bicrystals and polycrystals of niobium
[DE82-017406] N83-27231
FLUXES
A study of solvent and aqueous cleaning of fluxes
[AD-A124950] N83-26994
Performance of the CaF sub 2-CaO-SiO sub 2 system as a submerged arc welding flux for a niobium based HSLA steel N83-27231
The influence of flux composition on the chemistry and cleanliness of 2 1/4Cr-1Mo steel electroslag weld metal N83-27234
FLY ASH
Relation of coal characteristics to liquefaction behavior. Part 2: Continuous flow reactor studies by Gulf Research and Development Co.
[DE82-016938] N83-27046
FLYWHEELS
Nondestructive inspection and evaluation of composite-material flywheels
[DE82-015379] N83-26930
Potential of composite materials in surface transportation applications
[DE83-007218] N83-26931
Flywheel energy-storage-and-conversion system for photovoltaic applications
[DE82-017128] N83-27437
FOCUSING
Experiments on focusing systems in laser initiated discharge channels
[AD-A125296] N83-27207
The Livermore MTA Project and its influence on modern linacs N83-27725
Octupole focusing in transport and acceleration systems N83-27731
Funneling of heavy ion beams N83-27759
Experimental studies of electron beam focusing with solenoid lenses near the space charge limit N83-27772
Focussing considerations in the race track microtron and double-sided microtron N83-27774
FOILS
Interactions of fast molecular ions traversing thin foils: The contribution from field-ionized Rydberg atoms in measurements on Convoy electrons N83-27720
Interaction of hydrogen molecular ions with thin foils. Part 1: Convoy electrons N83-27721
Interaction of hydrogen molecular ions with thin foils. Part 2: Balmer emission N83-27722
Interaction of hydrogen molecular ions with thin foils. Part 3: Inner-shell ionization N83-27723
FOILS (MATERIALS)
Anomalies in the thickness dependence of the energy loss of helium and nitrogen ions in very thin carbon foils N83-27710
Inertial fusion research based on pulsed power
[DE82-018294] N83-27863
FOLDS (GEOLOGY)
The Ponta Grossa Arch: A proposal for ts configuration and evolution from the interpretation of remote sensing data
[E83-10343] N83-27320
FOOD CHAIN
Radionuclide fate and effects N83-27486
FORECASTING
Variational transition-state theory
[DE83-006003] N83-26973

Fluidelastic instability in shell and tube heat exchangers: A framework for a prediction method
[DE83-007612] N83-27264
Yield forecasting from remote sensing data: A survey of methods available in 1982 — crop yield
[REPT-M/83/5] N83-27343

FOREST FIRES
Terrestrial and riverine ecology N83-27482

FOREST MANAGEMENT
Detection of aspen/conifer forest mixes from multitemporal LANDSAT digital data — Bear River Range, Rocky Mountains
[E83-10324] N83-27309

FORESTS
Wildland inventory and resource modeling for Douglas and Carson City Counties, Nevada, using LANDSAT and digital terrain data
[E83-10302] N83-27293
Testimony presented to Subcommittee on Energy Development and Applications, US House of Representatives. Hearings on renewable energy in the eighties: Needs for further research, development and demonstration
[DE82-017407] N83-27430
Processes of atmospheric deposition of metals and acids to forests
[DE82-017442] N83-27504

FORGING
Powder forging of compound steels, part 1
[TULEA-1982-16-PT-1] N83-27012
Powder forging of compound steels, part 2
[TULEA-1982-17-PT-2] N83-27013

FORMALDEHYDE
Molecular beam studies of primary photochemical processes
[DE83-006190] N83-26946

FORMALISM
Automatic beam-steering of the Mainz Microtron N83-27775

FORMAT
LANDSAT-D data format control book. Volume 6, appendix C: Partially processed multispectral scanner high density tape (HDT-AM)
[E83-10274] N83-27286
LANDSAT-4 to ground station interface description
[E83-10292] N83-27291

FORMING TECHNIQUES
Concrete construction using slipform techniques
[AD-A124923] N83-27059

FORTRAN
Use of the C language pre-processor in the RT-11 FORTRAN environment
[DE82-010076] N83-27626
The ISOLR: An isometric plotting package for use with ORPLOT
[DE82-015819] N83-27627
Probabilistic design using numerical optimization
[AD-A125232] N83-27651

FOSSIL FUELS
Research strategy to permit greater utilization of domestic fossil energy resources
[DE82-018339] N83-27405
Small hydroelectric power plant for Aztec, New Mexico
[DE82-903957] N83-27432
Transformation of energy-related pollutants N83-27489
Sulfur control in fluidized-bed combustors: Methodology for predicting the performance of limestone and dolomite sorbents
[DE83-007658] N83-27500
Sulfur control in fluidized-bed combustors: Methodology for predicting the performance of limestone and dolomite sorbents. Addendum. Compilation of sorbent performance data from atmospheric fluidized-bed combustors
[DE83-007659] N83-27501
Beam dynamics studies of high current RFQ and DTL tanks N83-27756

FOULING
Dew points of hot gases from coal-gasification processes
[DE82-016337] N83-26964
Solvent Refined Coal (SRC) process. Corrosion-erosion study
[DE82-011499] N83-26966

FOURIER TRANSFORMATION
Synthetic-fuel combustion: Pollutant formation. Soot-initiation mechanisms in burning aromatics
[DE83-005611] N83-26945

FRACTOGRAPHY
Effects of ageing on the ductile-fracture mechanism in a high-strength low-alloy steel (300M)
[AERE-R-10783] N83-27015

FRACTURE MECHANICS
Analysis of a failed spent-char transfer line from the IGT HYGAS coal-gasification pilot plant
[DE82-014906] N83-26947
Assessment of the quality of bearing steel from its inclusion content
[BLL-M-26906-(5828.4)] N83-26991
Kinetics of void formation in strained metals
[ISSN-0208-5658] N83-26993
Powder forging of compound steels, part 2
[TULEA-1982-17-PT-2] N83-27013
Summary of ignition and growth modeling of shock initiation and delayed detonation in full-density and porous propellants
[DE83-007405] N83-27041
Fatigue crack growth from blunt notches
[GKSS-82/E/44] N83-27276
A study of elastic-plastic fracture parameters through the thickness of fracture toughness specimens using silicone-rubber crack impressions
[AERE-R-10815] N83-27280

FRACTURE STRENGTH
Effects of ageing on the ductile-fracture mechanism in a high-strength low-alloy steel (300M)
[AERE-R-10783] N83-27015
An evaluation of the precracked Charpy test — for nuclear reactor materials
[VTT-142] N83-27275
A study of elastic-plastic fracture parameters through the thickness of fracture toughness specimens using silicone-rubber crack impressions
[AERE-R-10815] N83-27280

FRACTURES (MATERIALS)
Nonlinear response arising from non self-similar crack growth in finite thickness plates
[DE83-005946] N83-27267

FRAMES
Optimization of three dimensional combined truss/frame structures
[AD-A124988] N83-27263

FRAMES (DATA PROCESSING)
LANDSAT-D data format control book. Volume 6, appendix C: Partially processed multispectral scanner high density tape (HDT-AM)
[E83-10274] N83-27286

FREE ELECTRON LASERS
A free electron laser driven by a long pulse induction linac
[AD-A125221] N83-27202

FREE JETS
Verification studies of entrained-flow gasification and combustion systems with the SIMMER-II code
[DE82-012148] N83-26978

FREE RADICALS
The FO2 radical and Laser Magnetic Resonance (LMR) spectra in reactions of fluorine atoms
[MPIS-19/1982] N83-26985

FREEZING
Synoptic precursors of three severe Brazilian freezes in the Pacific Ocean and South America
[INPE-2730-PRE/312] N83-27541

FREQUENCIES
A 15-meter deployable aperture microwave radiometer N83-26862
Effect of frequency-dependent soil parameters on reflection coefficients
[AD-A124798] N83-27091

FREQUENCY DISTRIBUTION
A note on the oscillation of cavities coupled to aerodynamic flows N83-26795

FREQUENCY DIVISION MULTIPLEXING
Performance optimization of PCM/SCO telemetry systems
[DE82-015797] N83-26917

FREQUENCY RANGES
Traveling-wave tube amplifier characteristics study for stochastic beam-cooling experiments
[DE83-005867] N83-27132

FRESNEL LENSES
Design and development of a high-concentration photovoltaic concentration (2-d)
[DE82-008924] N83-27433

FRICTION WELDING
Welding technology for energy conversion N83-27216

FRICTIONLESS ENVIRONMENTS
Calculation of the unsteady flow through relatively moving blade rows and the unsteady blade forces
[PNR-90158] N83-27183

FUEL CELL POWER PLANTS
Ammonia-air fuel cell power plant systems analysis
[DE82-018914:] N83-27464

FUEL COMBUSTION
Spray combustion of synthetic fuels. Phase 2: Spray-combustion phenomena
[DE82-015489] N83-26970
Proceedings of the Fourth International Symposium on Coal-Slurry Combustion, volume 3 — conferences
[DE82-016351] N83-26982
Proceedings of the Fourth International Symposium on Coal-Slurry Combustion, volume 4
[DE82-016336] N83-26983
Representations of combustion in computer models of spark ignition
[CFD/82/18] N83-26986
Application of numerical simulation methodology to automotive combustion
[DE82-015912] N83-27247
Thermodynamics of organic compounds
[AD-A125022] N83-27895

FUEL CONSUMPTION
Status of alcohol fuels utilization technology for highway transportation: A 1981 perspective. Volume 2: Compression-ignition engines
[DE83-008127] N83-27036
Increased automobile fuel efficiency and synthetic fuels: Alternatives for reducing oil imports. Background paper number 2: Selected technical and economic comparison of synthetic options
[PB83-147363] N83-27057
DOE/NASA Automotive Stirling Engine Project overview '83
[NASA-TM-83405] N83-27924
Automotive Stirling Engine Development Program
[NASA-CR-168074] N83-27925

FUEL GAGES
Simultaneous multipoint measurements of density gradients and temperature in a flame
[DE83-007291] N83-26975

FUEL PRODUCTION
Biological production of liquid fuels from biomass
[DE82-008652] N83-27048
TVA/DOE integrated onfarm alcohol production system, phase 2
[DE82-016973] N83-27049
End-Use Products of Fusion Energy: Alternatives and Their Implications to the Fusion Energy R and D Strategy
[PB83-151696] N83-27873

FUEL SYSTEMS
Dissociated methanol test results
[DE82-013565] N83-27054
Development of a pressurized fluidized-bed biomass gsifier to produce substitute fuels
[DE82-013265] N83-27401

FUEL TESTS
Dissociated methanol test results
[DE82-013565] N83-27054

FUEL-AIR RATIO
Combustion losses in automotive spark ignition and diesel engines
[DE83-006015] N83-27244

FUELS
Pulverized fuel and scaleup methodologies
[DE82-014822] N83-26962
An investigation of the effectiveness of smoke suppressant fuel additives for turbojet applications
[AD-A125025] N83-27034
Overview of fuel alcohol from agricultural crops with emphasis on the Tennessee Valley
[DE82-016932] N83-27050
International energy technology assessment: Atmospheric fluidized-bed combustion
[DE82-012430] N83-27404
Properties of three-dimensional energetic solids and molecular crystals
[AD-A124944] N83-27880

FUNCTION SPACE
Extension of interpolation theorems for weighted Sobolev spaces
[CTH-MATH-1983-2] N83-27673

FUNCTIONAL ANALYSIS
Some remarks on the continuation method of Leray-Schauder-Rabinowitz and the method of monotone iterations
[AD-A125267] N83-27645

FUNCTIONAL DESIGN SPECIFICATIONS
Time characteristic, capacity and conditions for the adoption of flexible production systems — for metal working
[PNR-90156] N83-27071
Design requirements for creep-feed grinders, part 3. Application of outside diameter creep-feed grinding, part 4
[PNR-90165-PT-3/4] N83-27076
LANDSAT-D flight segment operations manual, volume 1
[E83-10285] N83-27287
LANDSAT-D flight segment operations manual, volume 2
[E83-10286] N83-27288

FUNCTIONS (MATHEMATICS)
A calculation of wrinkled flames
[AD-A125258] N83-26943
FURNACES
Optical coatings by conveyorized atmospheric Chemical Vapor Deposition (CVD) N83-27368
FUSELAGES
Experimental study of main rotor/tail rotor/airframe interactions in hover. Volume 1: Text and figures
[NASA-CR-166485] N83-26820
FUSION WELDING
Welding technology for energy conversion N83-27216

G

GALACTIC NUCLEI
An electron-positron jet model for the galactic center N83-27929
Low-temperature positron annihilation N83-27932
The origin of the galactic annihilation radiation N83-27936
GALACTIC RADIATION
NASA/Goddard Space Flight Center contributions to the Workshop on Positron-Electron Pairs in Astrophysics
[NASA-TM-85027] N83-27928
Low-temperature positron annihilation N83-27932
Upper limits to the annihilation radiation luminosity of Centaurus A N83-27933
The origin of the galactic annihilation radiation N83-27936
GALAXIES
NASA/Goddard Space Flight Center contributions to the Workshop on Positron-Electron Pairs in Astrophysics
[NASA-TM-85027] N83-27928
GALERKIN METHOD
The lumped mass finite element method for a parabolic problem
[CTH-MATH-1983-1] N83-27672
GALLIUM ARSENIDES
Design of active impedance microwave monolithic circuits with a GaAs substrate
[ENST-E-82012] N83-27143
Growth and characterization of Czochralski-grown n and p-type GaAs for space solar cell substrates
[NASA-CR-168099] N83-27877
GAMMA FUNCTION
A modified Kolmogorov-Smirnov, Anderson-Darling, and Cramer-Von Mises test for the gamma distribution with unknown location and scale parameters
[AD-A124841] N83-27678
GAMMA RAY ASTRONOMY
Upper limits to the annihilation radiation luminosity of Centaurus A N83-27933
GAMMA RAY BEAMS
Gamma-gun in the center of the galaxy
[REPT-757] N83-27945
GAMMA RAY BURSTS
Comparison of photon-photon and photon-magnetic field pair production rates N83-27930
Criteria for grasar action in astrophysical sources N83-27937
GAMMA RAYS
Gamma-ray for simultaneous calorimetric assay
[DE82-008615] N83-27826
Scintillation analysis of gamma radiation with crystals of bismuth germanate
[AD-A124991] N83-27882
NASA/Goddard Space Flight Center contributions to the Workshop on Positron-Electron Pairs in Astrophysics
[NASA-TM-85027] N83-27928
Low-temperature positron annihilation N83-27932
Upper limits to the annihilation radiation luminosity of Centaurus A N83-27933
Pair production near threshold in pulsar magnetic fields N83-27934
Criteria for grasar action in astrophysical sources N83-27937
GARP ATLANTIC TROPICAL EXPERIMENT
Waterspout, gust fronts and associated cloud systems
[NASA-TM-85032] N83-27538
GAS ANALYSIS
A method for determining liquid volatility at ambient temperatures using an infrared gas analyzer
[AD-A124906] N83-26940
Numerical simulation of the influence of small scale mountain ranges on a baroclinic wave
[AD-A125301] N83-27546
GAS COMPOSITION
Measurement of the thermodynamic quantities for the AG-S system by the EMF method
[NRC/CNR-TT-2062] N83-27892
GAS DISCHARGE TUBES
Electromagnetic pulse protective properties in transient suppressors consisting of gas discharge tubes and filters
[FOA-C-30312-A3] N83-27142
GAS DYNAMICS
Effects of particle characteristics on performance of RRSK,PETN
[DE82-018553] N83-27044
GAS FLOW
Oblique interactions of detonation waves with explosive/metal interfaces
[DE83-007119] N83-27038
GAS GUNS
I. R. emission measurements of shocked rocket propellants by time-resolved infrared radiometry
[DE83-007356] N83-27042
Shock-wave response of titanium sunhydride-potassium perchlorate
[DE82-016739] N83-27043
GAS IONIZATION
Aeronautical Knowledge (selected articles)
[AD-A123935] N83-26925
GAS JETS
Gasification in pulverized coal flames. Investigation of pulverized coal-combustors and gasifiers: Multiple sub-reactor model and experimental results, part 2
[DE82-013001] N83-26965
GAS LASERS
Computational fluid dynamics: An engineering tool? N83-26796
A NASA high-power space-based laser research and applications program
[NASA-SP-464] N83-27200
GAS MIXTURES
A general-purpose computer code for predicting chemical-kinetic behavior behind incident and reflected shocks
[DE82-015878] N83-27169
GAS PIPES
Development of improved plastic piping materials and systems for fuel gas distribution
[PB83-161109] N83-27079
GAS PRESSURE
Modeling beam-front dynamics at low gas pressures
[DE82-016636] N83-27842
GAS RECOVERY
Methane recovery from horizontal holes in advance of mining
[DE82-017673] N83-27337
GAS TEMPERATURE
Method of studying the operating temperature of gas turbines --- aeroengines
[PNR-90159] N83-26842
GAS TUNGSTEN ARC WELDING
Weld penetration variation in GTA welding of some 304 L stainless steels N83-27222
GAS TURBINE ENGINES
Method of studying the operating temperature of gas turbines --- aeroengines
[PNR-90159] N83-26842
Demonstration and evaluation of gas turbine transit buses
[NASA-CR-165528] N83-27926
GAS TURBINES
Testing of felt-ceramic materials for combustor applications
[NASA-CR-168103] N83-26837
Finite element program for calculating flows in turbomachines with results for NASA task-1 compressor
[AD-A124987] N83-26841
Experimental study of strength and existance domain of ground-to-air inlet vortices by ground board static pressure measurements
[PB83-144865] N83-26843
Thermal-barrier coatings for utility gas turbines
[NASA-TM-85349] N83-27022
High-temperature turbine-technology program. Phase 2: Technology test and support studies. Design and development of a regeneratively fuel cooled high temperature gas turbine combustor for operation on low Btu gas
[DE83-007342] N83-27241
High-Temperature-Turbine-Technology Program. Phase 2: Technology test and support studies. Design and development of a high temperature low emissions combustor for stationary gas turbines
[DE83-005895] N83-27246
GAS WELDING
Processes quality assurance and examination of weld metal overlays N83-27220
GAS-SOLID INTERFACES
Mass flow measurement of solids/gas stream using radiometric techniques
[DE82-017028] N83-27170
GASIFICATION
Verification studies of entrained-flow gasification and combustion systems with the SIMMER-II code
[DE82-012148] N83-26978
Geo energy research and development: Technology transfer update
[DE83-007225] N83-27395
Development of a pressurized fluidized-bed biomass gasifier to produce substitute fuels
[DE82-013265] N83-27401
GATES (CIRCUITS)
Satellite systems requirements for land mobile communications N83-26856
Overview of pulsers for nanosecond gating of image-shutter tubes
[DE82-019533] N83-27850
GENERAL AVIATION AIRCRAFT
Determination of stability and control parameters of a general aviation airplane from flight data
[NASA-TM-84635] N83-26844
GEOCHEMISTRY
Solid wastes: Mobilization, fate and effects N83-27485
GEOCHRONOLOGY
The Ponta Grossa Arch: A proposal for ts configuration and evolution from the interpretation of remote sensing data
[E83-10343] N83-27320
GEOGRAPHY
Satellite systems requirements for land mobile communications N83-26856
GEOLOGY
Geology and mineral resources of the Baltimore, Boston, Lake Champlain, and Providence 1 deg by 2 deg NTMS quadrangles. National Uranium Resource Evaluation Program
[DE83-009825] N83-27327
Geology and mineral resources of the Baltimore 1 deg by 2 deg NTMS quadrangle, Maryland-Pennsylvania-Virginia N83-27328
Geology and mineral resources of the Boston 1 deg by 2 deg NTMS quadrangle, Massachusetts-New Hampshire N83-27329
Geology and mineral resources of the Lake Champlain 1 deg by 2 deg NTMS quadrangle, New Hampshire-New York-Vermont N83-27330
Geology and mineral resources of the Providence 1 deg by 2 deg NTMS quadrangle, Connecticut-Massachusetts-Rhode Island N83-27331
Siting guidelines for utility application of wind turbines
[DE83-007428] N83-27393
Candidate sites for future hot-dry-rock development in the United States
[DE83-007103] N83-27525
Department of Energy's Western Gas Sands Project multi-well experiment update
[DE82-018291] N83-27529
GEOMAGNETISM
Equatorial electrojet movements at Huancayo and Eusebio (Fortaleza) on selected quiet days
[INPE-2740-PRE/319] N83-27521
GEOMETRIC RECTIFICATION (IMAGERY)
Geometric accuracy of LANDSAT-4 MSS image data
[E83-10347] N83-27322
GEOMETRY
Rolling-element bearings
[NASA-RP-1105] N83-27214
GEOMORPHOLOGY
Mapping of land use and geomorphology in the APAPORE project area by LANDSAT satellite data, volume 2
[E83-10333] N83-27281
Mapping of land use and geomorphology in the APAPORE project area by LANDSAT satellite data, volume 3
[E83-10334] N83-27282
Mapping of land use and geomorphology in the APAPORE project area by LANDSAT satellite data, volume 1
[E83-10332] N83-27314
Satellite monitoring of vegetation and geology in semi-arid environments --- Tanzania
[E83-10343] N83-27318
GEOPHYSICAL FLUIDS
On the numerical prediction of vertical turbulent exchange in stratified flows --- geophysical flows, saline water
[TULEA-1981-08] N83-27340
GEOPHYSICS
Candidate sites for future hot-dry-rock development in the United States
[DE83-007103] N83-27525
GEOPRESSURE
Utility geothermal plans, Texas and Louisiana N83-27373

GEOSYNCHRONOUS ORBITS
Large space systems auxiliary propulsion requirements N83-26864
GEOTHERMAL ENERGY EXTRACTION
Proceedings of the Sixth Annual Geothermal Conference and Workshop
[DE83-901135] N83-27372
Utility geothermal plans, Texas and Louisiana N83-27373
Geothermal energy and the state water project N83-27374
GEOTHERMAL ENERGY UTILIZATION
Proceedings of the Sixth Annual Geothermal Conference and Workshop
[DE83-901135] N83-27372
Geothermal energy and the state water project N83-27374
Heber Binary Project. Binary Cycle Geothermal Demonstration Power Plant (RP1900-1) N83-27375
Geothermal steam separator evaluation (RP1672-1) N83-27377
Geothermal scale control by crystallization (RP1525-2) N83-27378
Overview of worldwide geothermal power development N83-27379
Small geothermal power plant. Portable turbine generator N83-27380
GEOTHERMAL RESOURCES
Assessment of the geothermal resources of Kansas
[DE83-003216] N83-27338
Proceedings of the Sixth Annual Geothermal Conference and Workshop
[DE83-901135] N83-27372
Wellhead power production with a rotary separator turbine (RP 1196) N83-27376
Simulated heat-exchanger tubes: DOE Geothermal Test Facility, East Mesa, California
[DE83-007415] N83-27391
Geo energy research and development: Technology transfer update
[DE83-007225] N83-27395
Candidate sites for future hot-dry-rock development in the United States
[DE83-007103] N83-27525
GEOTHERMAL TECHNOLOGY
Radiolabelling of chemicals
[DE82-017576] N83-26949
Technical support for geopressured-geothermal-well activities in Louisiana
[DE83-005297] N83-27473
GERMANATES
Scintillation analysis of gamma radiation with crystals of bismuth germanate
[AD-A124991] N83-27882
GEYSERS
Candidate sites for future hot-dry-rock development in the United States
[DE83-007103] N83-27525
GLASS
Role of amines in adhesion of polybutadiene to glass substrates. 4: The effect of amine structure and concentration on the strength of adhesion
[AD-A121686] N83-27028
Method for milling and drilling glass
[NASA-CASE-GSC-12636-1] N83-27058
A study of the stress wave factor technique for the characterization of composite materials
[NASA-CR-3670] N83-27248
Preparation and characterization of glassy and crystalline mixed chalcopyrite semiconducting compounds
[DE83-005352] N83-27889
GLASS COATINGS
Transparent heat-mirror materials and deposition technology
[DE83-007042] N83-27357
Performance and sputtering criteria of modern architectural glass coatings N83-27366
Production techniques for high volume sputtered films N83-27367
GLOBAL AIR SAMPLING PROGRAM
Aircraft measurements of trace gases and particles near the tropopause
[NASA-CR-3691] N83-27542
GLOBAL POSITIONING SYSTEM
Cost analysis of Navy acquisition alternatives for the NAVSTAR Global Positioning System
[AD-A125017] N83-26909
GOODNESS OF FIT
A new goodness of fit test for the uniform distribution with unspecified parameters
[AD-A124835] N83-27680
GOVERNMENT PROCUREMENT
Cost analysis of Navy acquisition alternatives for the NAVSTAR Global Positioning System
[AD-A125017] N83-26909
GOVERNMENT/INDUSTRY RELATIONS
After energy price decontrol: The role of government conservation programs
[RAND/N-1903-DOE] N83-27922
GRAIN BOUNDARIES
Propagation of creep cracks by cavitation in fine-grained materials
[DE83-005869] N83-27268
Fluxoid pinning by grain boundaries in bicrystals and polycrystals of niobium
[DE82-017406] N83-27891
GRAINS (FOOD)
Composition and assembly of a spectral and agronomic data base for 1980 spring small grain segments
[E83-10311] N83-27301
Research and development of LANDSAT-based crop inventory techniques
[E83-10359] N83-27325
GRAMMARS
NIGEL: A systemic grammar for text generation
[AD-A125253] N83-27622
GRAPH THEORY
Automatic generation of adequate graphs with given connectivity conditions
[FUB-20-1982] N83-27119
Test networks defined by an average rank and a planarity index --- telecommunication networks, graph theory
[FUB-31-1982] N83-27124
GRAPHITE
Catalytic CO2 gasification of graphite vs. coal char
[DE82-016412] N83-26959
Processing of fused silicide coatings for carbon-based materials
[NASA-TM-83362] N83-27019
The extinction of starlight at wavelengths near 2200A --- by inorganic particles N83-27941
GRAPHITE-EPOXY COMPOSITES
Compression and compression fatigue testing of composite laminates
[NASA-CR-168023] N83-26928
GRAPHS (CHARTS)
The EZDRAW: An interactive computer graphics program to design bar, line or pie graphs
[AD-A124901] N83-27620
GRAVITATION
Statistical review of counting accelerometer data for Navy and Marine fleet aircraft
[AD-A124966] N83-26834
GREAT PLAINS CORRIDOR (NORTH AMERICA)
Evaluation of trends in wheat yield models
[E83-10349] N83-27324
GREENHOUSE EFFECT
Proceedings of the Carbon Dioxide Research Conference: Carbon Dioxide, Science and Consensus
[DE83-007182] N83-27551
GREENHOUSES
Energy future Santa Cruz. A citizens plan for energy self-reliance: Executive summary
[PB83-136978] N83-27474
GREENLAND
The ice conditions in the Greenland waters, 1975
[ISBN-87-7478-185-5] N83-27566
GROUND EFFECT MACHINES
Experimental analysis of the performance of an annular peripheral jet vehicle in ground effect
[AD-A124949] N83-26832
GROUND TRUTH
Composition and assembly of a spectral and agronomic data base for 1980 spring small grain segments
[E83-10311] N83-27301
Australia ground data collection 1981-82 crop year, appendixes A and B, volume 2
[E83-10316] N83-27305
Australia ground data collection 1981-82 crop year, volume 1
[E83-10317] N83-27306
GROUND WATER
Solid wastes: Mobilization, fate and effects N83-27485
GROUP DYNAMICS
Psychological and system variables in team problem solving: Experimental studies of computer-mediated participation
[AD-A124924] N83-27596
GULF STREAM
A compilation of moored instrument data and associated oceanographic observations. Volume 30: Gulf Stream extension and Norwegian Sea overlow intrusion experiments, 1979 - 1980
[AD-A124818] N83-27562
GUN PROPELLANTS
The use of the Blake computer program to calculate thermodynamic properties of Australian-made gun propellants
[AD-A118605] N83-27615
GUSTS
Waterspout, gust fronts and associated cloud systems
[NASA-TM-85032] N83-27538
GYROSCOPES
Nuclear magnetic resonance gyroscope
[AD-A124925] N83-27185

H

HABITATS
Wildland inventory and resource modeling for Douglas and Carson City Counties, Nevada, using LANDSAT and digital terrain data
[E83-10302] N83-27293
HAFNIUM ALLOYS
RF sputtered silicon and hafnium nitrides: Properties and adhesion to 440C stainless steel
[NASA-TM-83400] N83-27020
HALL EFFECT
Effects of core nonuniformities on the performance of MHD generators
[DE83-005426] N83-27447
HAMILTONIAN FUNCTIONS
Atomistic nonequilibrium computer simulations
[DE82-017551] N83-27831
HANDBOOKS
Handbook of thermal insulation applications
[AD-A125264] N83-27158
HANDLING EQUIPMENT
Present situation in development of automated machining systems in Europe and America
[PNR-90152] N83-27068
HANKEL FUNCTIONS
A categorized theory of bilinear systems over a ring
[CSIR-TWISK-264] N83-27638
HARBORS
Seismic response of port and harbor facilities
[PB83-145490] N83-27534
HARDENING (MATERIALS)
A study of the effect of interrupted quenches on a thermomechanically processed high carbon steel
[AD-A124985] N83-26996
Powder forging of compound steels, part 1
[TULEA-1982-16-PT-1] N83-27012
Powder forging of compound steels, part 2
[TULEA-1982-17-PT-2] N83-27013
HARMONICS
A note on adaptive wind tunnels with imperfect control N83-26792
Ordinary mode auroral kilometric radiation, with harmonics, observed by ISIS 1
[NASA-TM-85036] N83-27517
HARTREE APPROXIMATION
The incorporation of particle collisions in the time-dependent Hartree-Fock approximation
[DE82-017481] N83-27818
HAWAII
Intermediate photovoltaic system application experiment operational performance report for G. N. Wilcox Hospital, Kauai, Hawaii for September 1982, volume 5
[DE83-006843] N83-27454
Kahuku kite wind study. 1: Kahuku beach boundary layer
[DE83-006403] N83-27553
Kahuku kite wind study. 2: Kahuku foothills
[DE83-006402] N83-27554
Tidal and lunar data for Point Mugu, San Nicolas Island, and the Barking Sands area during 1983
[AD-A124810] N83-27565
HEALTH PHYSICS
USSR report: Life sciences. Effects of nonionizing electromagnetic radiation, no. 9
[JPRS-83601] N83-27572
HEAT BALANCE
Transient heat flow along uni-directional fibers in composites
[AD-A122926] N83-26929
Effects of sleep deprivation on thermoregulation during exercise
[AD-A124982] N83-27580
HEAT EXCHANGERS
Antenna technology for orbital Very Long Baseline Interferometry (VLBI) N83-26859
Dew points of hot gases from coal-gasification processes
[DE82-016337] N83-26964
Solvent Refined Coal (SRC) process. Corrosion-erosion study
[DE82-011499] N83-26966
International Conference on Welding Technology for Energy Applications
[DE83-006404] N83-27215
Effect of joint design and fabrication limitations on tube-to-tubesheet welding N83-27235

Fluidelastic instability in shell and tube heat exchangers: A framework for a prediction method
[DE83-007812] N83-27264
Develop and test fuel cell powered on-site integrated total energy systems. Phase 3: Full-scale power plant development
[NASA-CR-168021] N83-27345
Phase 2 Brayton/Rankine 10-ton gas-fired space-conditioning system
[DE82-016367] N83-27355
Simulated heat-exchanger tubes: DOE Geothermal Test Facility, East Mesa, California
[DE83-007415] N83-27391
How to solve materials and design problems in solar heating and cooling, Energy Technology Review No. 77
[DE83-006116] N83-27456

HEAT FLUX
IEA small solar-power-system project, operation status
[DE82-020001] N83-27423

HEAT MEASUREMENT
Stopping power of Ni, Ag, Au and Pb for approximately 7 MeV/n alpha-particles and carbon ions (Z 3/1 proportional deviation from the Bethe formula) N83-27702
Gamma-ray for simultaneous calorimetric assay
[DE82-008615] N83-27826

HEAT OF COMBUSTION
Calculation of calorific value of coal/char from its ultimate analysis
[DE82-012879] N83-27899

HEAT OF SOLUTION
Thermal Desorption Spectroscopy (TDS) of hydrogen from niobium
[DE82-012024] N83-26981

HEAT PIPES
Design and development of a titanium heat-pipe space radiator
[DE82-013749] N83-27166
Nuclear reactor system study for NASA/JPL
[NASA-CR-172631] N83-27836
Space reactors
[DE82-019187] N83-27837

HEAT PUMPS
Optimized two-capacity advanced electric heat pump
[DE82-017447] N83-27173
Phase 2 Brayton/Rankine 10-ton gas-fired space-conditioning system
[DE82-016367] N83-27355
Solar-assisted water-source heat pump
[DE83-006023] N83-27457

HEAT RADIATORS
Design and development of a titanium heat-pipe space radiator
[DE82-013749] N83-27166

HEAT RESISTANT ALLOYS
The beneficial effect of zirconium and calcium when jointly microalloyed with high speed steels
[BLL-M-26914-(5828.4)] N83-26992
Aging response of a welded iron-based superalloy
[DE83-005856] N83-27005

HEAT STORAGE
Domestic olivine versus magnesite as a thermal energy storage material: Performance comparisons for electrically heated room-size units in accordance with ASHRAE standard 94.2
[DE82-017389] N83-27466
User manual AQUASTOR: A computer model for cost analysis of aquifer thermal-energy storage coupled with district heating or cooling systems. Volume 2: Appendices
[DE82-013889] N83-27631

HEAT TRANSFER
Body flap heat transfer data from space shuttle orbiter entry flight test maneuvers
[AD-A124844] N83-26914
Numerical computation of the matrix Riccati equation for heat propagation during space shuttle reentry
[AD-A124873] N83-26916
Solvent Refined Coal (SRC) process. Corrosion-erosion study
[DE82-011499] N83-26966
Verification studies of entrained-flow gasification and combustion systems with the SIMMER-II code
[DE82-012148] N83-26978
Measurement of the carbon activity of sodium with foils consisting of Fe-20Mn and stainless steel types A304L and 316L
[BLL-RISLEY-TRANS-4719(9091.9F)] N83-26989
NASA interdisciplinary collaboration in tribology. A review of oxidational wear
[NASA-CR-3686] N83-27021
Frequency-domain approach to passive building energy analysis
[DE82-019164] N83-27063
Heat-transfer distributions on biconics at incidence in hypersonic-hypervelocity He, N2, air, and CO2 flows
[NASA-TM-84667] N83-27150
Flash evaporation from turbulent water jets
[DE83-007311] N83-27168
Laboratory simulation of a deep-ocean in-situ heat-transfer experiment
[DE82-018656] N83-27171
Application of a new version of the k-W model of turbulence to a boundary layer with mass transfer
[CFD/82/15] N83-27182
Downhole steam-generator study. Volume 1: Conception and feasibilty evaluation
[DE82-018348] N83-27424
Analysis, design, fabrication, and testing of moderately concentrating solar-energy collectors
[DE83-006065] N83-27445
How to solve materials and design problems in solar heating and cooling, Energy Technology Review No. 77
[DE83-006116] N83-27456
DRAC: A user-friendly computer code for modeling transient thermohydraulic phenomena in solar-receiver tubing
[DE83-007091] N83-27458
A linearized, time dependent model of the heat transfer and thermoregulatory responses occurring upon immersion in cold water
[AD-A124972] N83-27586
Heat transfer/boundary layer investigation of heating discrepancies in wind tunnel testing of orbiter insulating articles
[AD-A124803] N83-27893

HEAT TRANSMISSION
Transient heat flow along uni-directional fibers in composites
[AD-A122926] N83-26929
Engineering and manufacture of a high-efficiency, automatic defrosting refrigerator-freezer
[DE82-017480] N83-27065
Detectability of defects by thermal non-destructive testing
[AERE-R-10802] N83-27250
A computer program for the simulation of heat and moisture flow in soils
[E83-10342] N83-27317
Atomistic nonequilibrium computer simulations
[DE82-017551] N83-27831

HEAT TREATMENT
Response of bainitic 2 1/4 Cr-1 Mo steel to creep-fatigue loadings at 482 deg C
[DE82-017445] N83-27011
Powder forging of compound steels, part 2
[TULEA-1982-17-PT-2] N83-27013
Effect of joint design and fabrication limitations on tube-to-tubesheet welding N83-27235

HEATING
Thermal performance of a double-envelope house
[DE82-018061] N83-27417
City of Tucson solar code
[DE82-016788] N83-27418
Validation of passive-solar analysis/design tools using class A performance-evaluation data
[DE82-017588] N83-27420

HEATING EQUIPMENT
Economic evaluation of end-user conservation measures applied to buildings served by a proposed district-heating system
[DE82-016080] N83-27470

HEAVY ELEMENTS
Plating wastes survey
[AD-A125230] N83-27480

HEAVY IONS
Comparison of neutron and heavy-ion damage in a stable austenite
[DE82-017369] N83-27009
Heavy-ion-spectrometer system --- operation safety procedures
[DE82-017049] N83-27190
Stopping power of Ni, Ag, Au and Pb for approximately 7 MeV/n alpha-particles and carbon ions (Z 3/1 proportional deviation from the Bethe formula) N83-27702
Ion-channelling effects in scanning ion microscopy with a Ga+ probe N83-27709
Energy loss of heavy ions as a function of target thickness: Ne yields C N83-27711
Status report on operation and upgrading of the Unilac N83-27727
Status of the Argonne superconducting-linac heavy-ion booster N83-27730
Beam dynamics in heavy ion induction linacs N83-27750
Computer simulation of longitudinal-transverse space charge effects in bunched beams N83-27751
Funneling of heavy ion beams N83-27759
Low frequency RFQ linacs for heavy ion fusion N83-27767
Longitudinal beam optimization of the Argonne superconducting heavy-ion liner accelerator N83-27780
Measurement of model inter-digital H type linac N83-27786
An RFQ linac for heavy ion acceleration N83-27787
Buncher section optimization of heavy ion RFQ linacs N83-27790
Emission of high-energy, light particles from intermediate-energy heavy-ion reactions
[DE82-017403] N83-27815
The role of rotational degrees of freedom in heavy-ion collisions
[DE82-015751] N83-27820
Database automation of accelerator operation
[DE82-017525] N83-27915
Energetic-ion acceleration and transport in the upstream region of Jupiter: Voyager 1 and 2
[NASA-TM-85179] N83-27946

HEIGHT
Kahuku kite wind study. 1: Kahuku beach boundary layer
[DE83-006403] N83-27553
Kahuku kite wind study. 2: Kahuku foothills
[DE83-006402] N83-27554

HELICAL WINDINGS
Measurement of the helical field of JIPP T-11
[IPPJ-625] N83-27855

HELICOPTER DESIGN
Hand-held computer programs for preliminary helicopter design
[AD-A125036] N83-27624

HELICOPTER TAIL ROTORS
Experimental study of main rotor/tail rotor/airframe interactions in hover. Volume 1: Text and figures
[NASA-CR-166485] N83-26820

HELICOPTERS
Sandia Helicopter Acoustic Detector (SHAD)
[DE82-018925] N83-27803

HELIOSTATS
Concentrated solar-flux measurements at the IEA-SSPS solar-central-receiver power plant, Tabernas - Lameria (Spain)
[DE82-020000] N83-27528

HELIUM
Heat-transfer distributions on biconics at incidence in hypersonic-hypervelocity He, N2, air, and CO2 flows
[NASA-TM-84667] N83-27150

HELIUM IONS
Stopping power of rare gases in amorphous silicon for MeV helium ions N83-27707
Anomalies in the thickness dependence of the energy loss of helium and nitrogen ions in very thin carbon foils N83-27710
Medium dependence of charge state fractions of MeV He beam N83-27718
Interaction of hydrogen molecular ions with thin foils. Part 1: Convoy electrons N83-27721

HELMET MOUNTED DISPLAYS
Manufacturing Methods and Technology (MM&T) specifications for miniature cathode ray tube
[AD-A124954] N83-27131

HERBICIDES
Large-scale operations management test of use of the White Amur for control of problem aquatic plants. Part 4. Third year poststocking results. Volume 6. The water and sediment quality of Lake Conway, Florida
[AD-A124443] N83-27479

HETEROGENEITY
Molecular ingredients of heterogeneous catalysis
[DE82-018584] N83-26950

HIERARCHIES
Two papers on circuit extraction
[AD-A125304] N83-27130
Optimal smoothing and estimation for hybrid state processes
[AD-A124907] N83-27683

HIGH ALTITUDE
High altitude jet fuel photochemistry
[AD-A125035] N83-27035

HIGH ENERGY ELECTRONS
The pulsed proton prototype of a high current ion linac N83-27747
Beam dynamics in heavy ion induction linacs N83-27750

HIGH ENERGY INTERACTIONS
Remarks on future accelerators and future physics
[DE83-006643] N83-27822
Diffractive interactions of hadrons at high energies
[DE82-019463] N83-27830

HIGH FREQUENCIES
High frequency, high power capacitor development
[NASA-CR-168035] N83-27127

HIGH GAIN
High-gain error actuated flight control systems for continuous linear multivariable plants
[AD-A124871] N83-26848

HIGH PRESSURE
Experiments with phase transitions at very high pressure — compressed solidified gases, semiconductors, superconductors, and molecular crystals
[NASA-CR-3696] N83-27879

HIGH RESOLUTION
High-resolution stimulated Raman spectroscopy
[DE82-013490] N83-26956

HIGH SPEED
Injection, atomization, ignition and combustion of liquid fuels in high-speed air streams
[AD-A125237] N83-27033

HIGH STRENGTH STEELS
The beneficial effect of zirconium and calcium when jointly microalloyed with high speed steels
[BLL-M-26914-(5828.4)] N83-26992
Effects of ageing on the ductile-fracture mechanism in a high-strength low-alloy steel (300M)
[AERE-R-10783] N83-27015
Relationship between structure and impact strength in as-solidified welds of mild and low alloy steels
[BLL-DRIC-T-6775-(3623.66)] N83-27251
An evaluation of the precracked Charpy test — for nuclear reactor materials
[VTT-142] N83-27275

HIGH TEMPERATURE
High-temperature corrosion of iron in sulfur-containing atmosphere
[DE83-006965] N83-27007
Correlation of compressive stress with spalling of plasma sprayed ceramic materials
[NASA-TM-83406] N83-27016
High-Temperature-Turbine-Technology Program. Phase 2: Technology test and support studies. Design and development of a high temperature low emissions combustor for stationary gas turbines
[DE83-005895] N83-27246

HIGH TEMPERATURE GASES
Curved film cooling admission tube
[NASA-CASE-LEW-13174-1] N83-27144

HIGH VOLTAGES
SAFE II: Large systems space plasma evaluation experiment N83-26903
Electronic system for high power load control — solar arrays
[NASA-CASE-NPO-15358-1] N83-27126

HMX
Corner-turning characteristics of TATB/HMX/Kel-F mixtures
[DE83-006931] N83-27037

HOLOGRAPHIC INTERFEROMETRY
Vibration analysis of a spinning disk using image derotated holographic interferometry N83-26811
Feasibility study of three-dimensional holographic interferometry for aerodynamics
[NASA-CR-166483] N83-27845

HOMOGENIZING
A variable strength permanent magnet dipole N83-27745

HOOPS
Hoop/column antenna development program N83-26874

HORIZONTAL ORIENTATION
Concrete construction using slipform techniques
[AD-A124923] N83-27059

HOVERING
Experimental study of main rotor/tail rotor/airframe interactions in hover. Volume 1: Text and figures
[NASA-CR-166485] N83-26820

HTPB PROPELLANTS
Boron-containing fuel-rich HTBP propellants. Manufacturing, burning experiments and specific impulse calculations
[FOA-C-20483-D1] N83-27055

HUMAN BEINGS
A model for human visual processing which explains perceptions of motion-after-effects
[AD-A124842] N83-27588

HUMAN FACTORS ENGINEERING
Pilot human factors in stall/spin accidents of supersonic fighter aircraft
[NASA-TM-84348] N83-26846
Human information processing guidelines for decision-aiding displays
[AD-A124858] N83-27599
Operational readiness and the human factors environment
[DE83-005586] N83-27602
The VDU operators' preferred environmental conditions in a telephone information center — video display device luminance
[TULEA-1982-11] N83-27603

HUMAN PERFORMANCE
S-C-R compatibility and dual task performance in two complex information processing tasks: Threat evaluation and fault diagnosis
[AD-A124340] N83-27589
Estimating aircrew fatigue: A technique with application to airlift operations
[AD-A125319] N83-27594

HUMIDITY MEASUREMENT
Interface unit for relative humidity measurement with dew point meter
[FOA-C-30309-E] N83-27556

HYDRATION
Development of a biochemical process for production of alcohol fuel from peat
[DE82-016892] N83-27039

HYDRAULIC ANALOGIES
Evaluation of physical and numerical hydraulic models, Masonboro Inlet, North Carolina
[AD-A116110] N83-27557

HYDRAULIC EQUIPMENT
Data base for hydraulically stimulated gas wells producing from tight sands formations
[DE82-013029] N83-27332
Hydraulic air compressor as part of an ultra low-head hydropower system
[DE82-018428] N83-27425

HYDRAZINES
Effects of hydrazine and pH on the corrosion of copper-alloy materials in AVT environments with oxygen
[DE83-901124] N83-27004

HYDRIDES
Electronic-energy-band structure of uranium hydride
[DE82-016393] N83-27884

HYDROCARBONS
Pulverized fuel and scaleup methodologies
[DE82-014822] N83-26962
Ecological effects of coal conversion N83-27484
Solid wastes: Mobilization, fate and effects N83-27485
Thermodynamics of organic compounds
[AD-A125022] N83-27895

HYDRODYNAMICS
On Synge's criterion for the stability of plane Couette flow N83-26802
Summary of ignition and growth modeling of shock initiation and delayed detonation in full-density and porous propellants
[DE83-007405] N83-27041
Jet penetration of inerts and explosives
[DE83-003746] N83-27052
Application of a new version of the k-W model of turbulence to a boundary layer with mass transfer
[CFD/82/15] N83-27182
Wave forces on circular cylinders with large excrescences at low Keulegan and Carpenter numbers — water waves
[NMI-R-133] N83-27254
An investigation of the dynamics of the plasma corona
[DE82-019397] N83-27867

HYDROELECTRIC POWER STATIONS
Small hydroelectric power plant for Aztec, New Mexico
[DE82-903957] N83-27432

HYDROELECTRICITY
Increased efficiency of hydroelectric power
[DE82-905771] N83-27403

HYDROGEN
Effects of magnetic impurities on the apparent diffusion coefficient of hydrogen in metal hydrides deduced from NMR
[DE82-019124] N83-26979
Hydrogen transport in and through niobium
[DE82-017214] N83-26980
Mean excitation energies for use in Bethe's stopping-power formula N83-27703
An NMR study of hydrogen diffusion in metal hydrides containing parametric impurities
[DE83-004859] N83-27890

HYDROGEN EMBRITTLEMENT
Kinetics of hydrogen-induced stress corrosion cracking. Part 1: Important features of cracking with regard to high strength steels
[BLL-RISLEY-TRANS-4701(9091.9F)] N83-26990

HYDROGEN IONS
Interaction of hydrogen molecular ions with thin foils. Part 2: Balmer emission N83-27722
Interaction of hydrogen molecular ions with thin foils. Part 3: Inner-shell ionization N83-27723

HYDROGEN ISOTOPES
Variational transition-state theory
[DE83-006003] N83-26973
Retention and recycling of plasma-edge hydrogen isotopes in C and TiC
[DE82-019959] N83-27814

HYDROGEN PLASMA
Simple method of sheet plasma production in lower pressure
[IPPJ-628] N83-27857

HYDROGEN PRODUCTION
Hydrogen derived from ammonia: Small-scale costs
[DE82-012720] N83-27040
Thermochemical processes for solar hydrogen production
[DE82-019575] N83-27047
Engineering analysis of potential photosynthetic bacterial hydrogen-production systems
[DE82-019151] N83-27414

HYDROGENATION
Chromatography of coal derived oil
[BLL-T5991/BG/MRA14684/82] N83-26935
Solvent Refined Coal (SRC) process. Corrosion-erosion study
[DE82-011499] N83-26966
Relation of coal characteristics to liquefaction behavior. Part 2: Continuous flow reactor studies by Gulf Research and Development Co.
[DE82-016938] N83-27046
Deactivation and regeneration of hydrogenolysis activity over Rh-Ag bimetallic catalysts supported on TiO2
[DE82-011240] N83-27449

HYDROGRAPHY
Interpretation of the physical oceanography of Georges Bank, volume 1
[PB83-149054] N83-27568

HYDROLOGY
Hydraulic air compressor as part of an ultra low-head hydropower system
[DE82-018428] N83-27425

HYDROLOGY MODELS
State space models of the Nash cascade: Kinematic and diffusion waves — dynamic hydrology systems
[TULEA-1981-14] N83-27341
On the discretization of the continuous Nash-cascade — hydrological forecasting
[TULEA-1981-17] N83-27342

HYDROLYSIS
Identification and cleavage of breakable single bonds by selective oxidation, reduction, and hydrolysis
[DE82-016800] N83-26957

HYDROSTATICS
Hybrid hydrostatic/ball bearings in high-speed turbomachinery
[NASA-CR-168124] N83-27213

HYDROTHERMAL CRYSTAL GROWTH
Synthetic studies of antimony sulfur iodide and predictions/synthesis of new nitrogen containing crystal structures
[AD-A124977] N83-27881

HYPERBOLAS
Boundary conditions for suppressing rapidly moving components in hyperbolic systems, 1
[AD-A120962] N83-27164

HYPERBOLIC DIFFERENTIAL EQUATIONS
Boundary conditions for suppressing rapidly moving components in hyperbolic systems. 2: An example
[AD-A120963] N83-27165
Lax-Wendroff methods for hyperbolic history value problems
[AD-A125283] N83-27649
Finite element methods for linear hyberbolic problems
[CTH-MATH-1983-4] N83-27674

HYPERVELOCITY FLOW
Heat-transfer distributions on biconics at incidence in hypersonic-hypervelocity He, N2, air, and CO2 flows
[NASA-TM-84667] N83-27150

I

IBM 370 COMPUTER
Networking DEC and IBM computers
[NASA-TM-85019] N83-27633

ICE
The 2.8 to 3.6 micron spectra of micro-organisms with varying H2O-ice content N83-27942

ICE FORMATION
The ice conditions in the Greenland waters, 1975
[ISBN-87-7478-185-5] N83-27566

ICE REPORTING
The ice conditions in the Greenland waters, 1975
[ISBN-87-7478-185-5] N83-27566

IDEAL FLUIDS
On steady vortex flow in two dimensions, 1
[AD-A120965] N83-27162

IDENTIFYING
Laser marking of component parts
[DE83-006728] N83-27208

IGNITION
Ignition of flamelets behind incident shock waves and the transition to detonation
[AD-A125217] N83-26939
Autoignition of kerosene/oxygen mixtures in a fluidized bed
[DE82-016376] N83-26952
Ignition and flame-propagation studies with adaptive numerical grids
[DE83-005462] N83-26976
Injection, atomization, ignition and combustion of liquid fuels in high-speed air streams
[AD-A125237] N83-27033
Laboratory tests at elevated pressures of a silane igniter system for in-situ coal gasification
[DE83-007217] N83-27450

ILLUMINANCE
The VDU operators' preferred environmental conditions in a telephone information center --- video display device luminance
[TULEA-1982-11] N83-27603

ILLUMINATING
Collector trade-off study for BDM PRDA-35 application
[DE82-013532] N83-27434

IMAGE ANALYSIS
Texture functions in image analysis: A computationally efficient solution
[NASA-TM-85022] N83-27326
Motion estimation based on multiple local constraints and nonlinear smoothing
[AD-A124838] N83-27640

IMAGE CONVERTERS
Determining light intensity for use with intermittent or rotating prism cameras utilizing a cinematographic light-intensity translator
[DE82-015414] N83-27189

IMAGE ENHANCEMENT
Effect of scene illumination conditions on digital enhancement techniques of multispectral scanner LANDSAT images
[E83-10344] N83-27319

IMAGE INTENSIFIERS
Overview of pulsers for nanosecond gating of image-shutter tubes
[DE82-019533] N83-27850

IMAGE PROCESSING
Information theoretic detection of objects embedded in cluttered aerial scenes
[AD-A124975] N83-27187
Development of techniques for producing static strata maps and development of photointerpretive methods based on multitemporal LANDSAT data
[E83-10081] N83-27284
LANDSAT-D data format control book. Volume 6, appendix C: Partially processed multispectral scanner high density tape (HDT-AM)
[E83-10274] N83-27286
Selecting band combinations with thematic mapper data
[E83-10303] N83-27294
The possible modifications of the HISSE model for pure LANDSAT agricultural data
[E83-10305] N83-27295
Satellite monitoring of vegetation and geology in semi-arid environments --- Tanzania
[E83-10343] N83-27318
Using pyramids to detect good continuation
[AD-A124848] N83-27616
Development of procedures and algorithms for pattern recognition and image processing based on two-dimensional Markov models
[AD-A124917] N83-27682
Contour-based motion estimation
[AD-A124812] N83-27848
Determining velocities by propagation
[AD-A124889] N83-27849

IMAGE RESOLUTION
Automatic threshold design for a bound document scanner
[AD-A125316] N83-27913

IMAGES
Components of mental imagery representation
[AD-A124616] N83-27591

IMPACT LOADS
I. R. emission measurements of shocked rocket propellants by time-resolved infrared radiometry
[DE83-007356] N83-27042
Stability of an impact-loaded elastic column with two degrees of freedom
[TULEA-1981-05-T] N83-27270
Influence of damping on the transverse displacement of an impact-loaded column with two degrees of freedom
[TULEA-1981-06-T] N83-27271

IMPACT STRENGTH
Relationship between structure and impact strength in as-solidified welds of mild and low alloy steels
[BLL-DRIC-T-6775-(3623.66)] N83-27251

IMPEDANCE
Isolation transformers for utility-interactive photovoltaic systems
[DE83-006914] N83-27140
Lithium/SO2 cathode studies
[DE82-012777] N83-27462

IMPEDANCE MATCHING
Overview of pulsers for nanosecond gating of image-shutter tubes
[DE82-019533] N83-27850

IMPEDANCE MEASUREMENT
Experimental investigation of a mechanical impedance gauge based on measurement of strains on a conical rod
[TULEA-1981-66-T] N83-27272
Determination of mechanical impedance through strain measurement on an impacted slender rod
[TULEA-1982-33-T] N83-27274

IMPURITIES
Design of REC permanent magnet quadrupoles taking into account B, H non-linearity N83-27770
Experimental studies on pump limiters
[DE82-017408] N83-27868
Deep impurities: A crystalline cluster approach
[INPE-2717-PRE/303] N83-27878

INCIDENCE
Equipment for recording the direction of incidence of infrasonic sound waves. Technical description
[FOA-C-30307-E1] N83-27807

INCIDENT RADIATION
A general-purpose computer code for predicting chemical-kinetic behavior behind incident and reflected shocks
[DE82-015878] N83-27169

INCINERATORS
Status, trends and implications of carbon fiber material use
[PB83-147751] N83-26934
Incinerator development program for processing transuranic waste at the Idaho National Engineering Laboratory
[DE82-017265] N83-27839

INCOMPRESSIBLE FLOW
MARIAH: A finite-element computer program for incompressible porous-flow problems, user's manual
[DE83-006847] N83-27167
Calculation of the unsteady flow through relatively moving blade rows and the unsteady blade forces
[PNR-90158] N83-27183

INCONEL (TRADEMARK)
Some observations on the physical metallurgy of nickel alloy weld metals N83-27240

INDEXES (DOCUMENTATION)
National Energy Software Center: Compilation of program abstracts
[DE83-001550] N83-27630
NASA STI-RECON Bulletin and Tech Info News
[NASA-CR-172685] N83-27904
Index encoding: A compression technique for large statistical databases
[DE83-006431] N83-27917

INDEXES (RATIOS)
Test networks defined by an average rank and a planarity index --- telecommunication networks, graph theory
[FUB-31-1982] N83-27124

INDICATORS
Validation of brain event-related potentials as indicators of cognitive styles, abilities, and aptitudes
[AD-A125292] N83-27593

INDIUM
High quality transparent heat reflectors of reactively evaporated indium tin oxide N83-27363
Continuous coating of indium tin oxide onto large area flexible substrates N83-27370
New techniques for roll coating of optical thin film N83-27371

INDUCTION
The image displacement instability in radial line accelerators N83-27777

INDUCTORS
Linear problem of inductor synthesis for a Tokamak thermonuclear apparatus
[BLL-CTO-2116-(9091.9F)] N83-27852

INDUSTRIAL ENERGY
Spray combustion of synthetic fuels. Phase 2: Spray-combustion phenomena
[DE82-015489] N83-26970
Conducted and radiated signatures of fluorescent lamp systems in C and I environments N83-27108
International energy technology assessment: Atmospheric fluidized-bed combustion
[DE82-012430] N83-27404

INDUSTRIAL PLANTS
Load leveling on industrial refrigeration systems
[DE82-902079] N83-27066

INDUSTRIAL SAFETY
Environmental safety and health requirements. Intermediate level skills training program
[DE82-013800] N83-27503

INDUSTRIAL WASTES
The beneficiation of power station coal ash and its use in heavy clay ceramics
[AERE-R-10806] N83-27031
Plating wastes survey
[AD-A125230] N83-27480

INDUSTRIES
Status, trends and implications of carbon fiber material use
[PB83-147751] N83-26934

INELASTIC SCATTERING
Photon-photon collisions
[DE83-007011] N83-27813
Folding models for elastic and inelastic scattering
[DE82-017426] N83-27819
High-energy physics at Tufts University
[DE83-007503] N83-27840

INERTIA
Numerical simulations for intense light-ion beam propagation in channel under influence of plasma inertia
[IPPJ-627] N83-27854

INERTIAL CONFINEMENT FUSION
Energy and technology review
[DE82-019880] N83-27390
Inertial fusion research based on pulsed power
[DE82-018294] N83-27863

INERTIAL FUSION (REACTOR)
Beam dynamics in heavy ion induction linacs N83-27750
Low frequency RFQ linacs for heavy ion fusion N83-27767

INERTIAL NAVIGATION
Investigation of a third order baro-damped verticle channel of INS
[AD-A124882] N83-26828

INFERENCE
Conditional permutation tests and the propensity score in observational studies
[AD-A125241] N83-27658
Sensitivity of Bayes inference with ignorable but data-dependent stopping rules
[AD-A125306] N83-27685

INFLATABLE STRUCTURES
Inflated antennas N83-26877

INFORMATION FLOW
Concepts for a Standard Data Interchange Structure (SDIS) INPE proposal to CCSDS/Panel 3
[INPE-2724-PRE/308] N83-27087

INFORMATION RETRIEVAL
Use of DOE/RECON in environmental protection
[DE82-017506] N83-27499
Query optimization in distributed databases
[AD-A124921] N83-27909

INFORMATION SYSTEMS
Use of DOE/RECON in environmental protection
[DE82-017506] N83-27499
The DMSP/MFR total ozone and radiance data base
[NASA-CR-170370] N83-27531
Human information processing guidelines for decision-aiding displays
[AD-A124858] N83-27599
NASA STI-RECON Bulletin and Tech Info News
[NASA-CR-172685] N83-27904

INFORMATION THEORY
Summaries of the FY 1982 Applied Mathematical Sciences Research Program
[DE83-005815] N83-27668

INFRARED ASTRONOMY
Structures for large precision reflectors N83-26871
Large Deployable Reflector Science and Technology Workshop. Volume 2: Scientific Rationale and Technology Requirements
[NASA-CP-2275] N83-27939

INFRARED DETECTORS
Estimation of launch vehicle performance parameters from 2 orbiting sensors
[AD-A124802] N83-26907

INFRARED IMAGERY
Simulation program of rotary wings
[FOA-C-30308-E1] N83-26836
Satellite applications to acoustic prediction systems
[AD-A125027] N83-27564

INFRARED INSTRUMENTS
A method for determining liquid volatility at ambient temperatures using an infrared gas analyzer
[AD-A124906] N83-26940

INFRARED RADIATION
I. R. emission measurements of shocked rocket propellants by time-resolved infrared radiometry [DE83-007356] N83-27042
Transparent Heat Reflecting Coatings (THRC) based on highly doped tin oxide and indium oxide N83-27362
INFRARED SPECTRA
The extinction of starlight at wavelengths near 2200A. The 2.8 to 3.6 micron spectra of micro-organisms with varying H2O-ice content [PREPRINT-85] N83-27940
The 2.8 to 3.6 micron spectra of micro-organisms with varying H2O-ice content N83-27942
INFRASONIC FREQUENCIES
Equipment for recording the direction of incidence of infrasonic sound waves. Technical description [FOA-C-30307-E1] N83-27807
INGESTION (ENGINES)
Experimental study of strength and existance domain of ground-to-air inlet vortices by ground board static pressure measurements [PB83-144865] N83-26843
INHIBITORS
The beneficial effect of zirconium and calcium when jointly microalloyed with high speed steels [BLL-M-26914-(5828.4)] N83-26992
INJECTORS
Design and constraints for the ZEBRA injector, RFQ and DTL N83-27736
INLET FLOW
Dynamic distortion in a short s-shaped subsonic diffuser with flow separation — Lewis 8 by 6 foot Supersonic Wind Tunnel [NASA-TM-84312] N83-26838
INLET NOZZLES
Model aerodynamic test results for a refined actuated inlet ejector nozzle at simulated takeoff and cruise conditions [NASA-CR-168051] N83-26816
INLET TEMPERATURE
Coaxial dump combustor investigations N83-26791
INOCULATION
The beneficial effect of zirconium and calcium when jointly microalloyed with high speed steels [BLL-M-26914-(5828.4)] N83-26992
INPUT
Input generator for Denton 3-dimensional turbomachine-blade-row analysis code [NASA-TM-23324] N83-26817
Concepts evaluation model V input-data system [AD-A124891] N83-27908
INSECTS
Terrestrial and riverine ecology N83-27482
INSOLATION
Frequency-domain approach to passive building energy analysis [DE82-019164] N83-27063
Assessing solar energy and water use efficiencies in winter wheat [E83-10329] N83-27313
IEA small solar-power-system project, operation status [DE82-020001] N83-27423
Intermediate photovoltaic system application experimental operational performance report for Newman Power Station, El Paso, Texas for September 1982, volume 15 [DE83-006845] N83-27459
Intermediate photovoltaic system application experiment operational performance report for Beverly High School, Beverly, Massachusetts for August 1982, volume 12 [DE83-007092] N83-27460
INSTRUMENT TRANSFORMERS
Isolation transformers for utility-interactive photovoltaic systems [DE83-006914] N83-27140
INSULATORS
Deep impurities: A crystalline cluster approach [INPE-2717-PRE/303] N83-27878
INTAKE SYSTEMS
A free electron laser driven by a long pulse induction linac [AD-A125221] N83-27202
Investigation of the coupling of unsteady lift to low order acoustic duct modes in an axial flow fan [AD-A124819] N83-27796
INTEGRAL EQUATIONS
Three-dimensional wave propagation using boundary integral equation techniques [AD-A124956] N83-27103
INTEGRATED CIRCUITS
Phased array-fed antenna configuration study [NASA-CR-168077] N83-27086
Sandia Micro Generation for Integrated Circuits (SMAGIC) system and the hierarchical artwork (HAT) language [DE82-009912] N83-27134
Aluminum nitride thin film and composite bulk wave resonators [DE82-019303] N83-27135
Design of active impedance microwave monolithic circuits with a GaAs substrate [ENST-E-82012] N83-27143
A visit to the Computer Science Department [AD-A124855] N83-27607
INTEGRATED ENERGY SYSTEMS
Develop and test fuel cell powered on-site integrated total energy system [NASA-CR-168021] N83-27348
INTELSAT SATELLITES
INTELSAT 6 antenna system design and development N83-26888
INTERFACES
Interface unit for relative humidity measurement with dew point meter [FOA-C-30309-E] N83-27556
Interfacing a torsion pendulum with a microcomputer [DE83-004032] N83-27792
LAMPF transition region [DE82-019489] N83-27824
Spelling correction in user interfaces [AD-A125208] N83-27906
INTERFACIAL TENSION
An instrument for measuring dynamic surface tension — jet flow [VTT-140] N83-27198
INTERFERENCE
The performance of a PN spread spectrum receiver preceded by an adaptive interference suppression filter [AD-A124903] N83-27098
INTERFERENCE DRAG
Interference effects on the drag loading for groups of cylinders in uni-directional flow — water waves, offshore structures [NMI-R-130] N83-27147
INTERMOLECULAR FORCES
Investigation of the potential functions of weakly bound diatomic molecules and laser-assisted excitive Penning ionization [DE82-017259] N83-27833
INTERNAL COMBUSTION ENGINES
Computational fluid dynamics: An engineering tool? N83-26796
Representations of combustion in computer models of spark ignition [CFD/82/18] N83-26986
Status of alcohol fuels utilization technology for highway transportation: A 1981 perspective. Volume 2: Compression-ignition engines [DE83-008127] N83-27036
Assessment of water addition to spark ignition engines [DE83-006013] N83-27245
Application of numerical simulation methodology to automotive combustion [DE82-015912] N83-27247
INTERNAL PRESSURE
Coaxial dump combustor investigations N83-26791
INTERPOLATION
Extension of interpolation theorems for weighted Sobolev spaces [CTH-MATH-1983-2] N83-27673
INTERSTELLAR EXTINCTION
The extinction of starlight at wavelengths near 2200A. The 2.8 to 3.6 micron spectra of micro-organisms with varying H2O-ice content [PREPRINT-85] N83-27940
The extinction of starlight at wavelengths near 2200A — by inorganic particles N83-27941
INTERSTELLAR MATTER
The extinction of starlight at wavelengths near 2200A. The 2.8 to 3.6 micron spectra of micro-organisms with varying H2O-ice content [PREPRINT-85] N83-27940
The 2.8 to 3.6 micron spectra of micro-organisms with varying H2O-ice content N83-27942
Interstellar proteins and the discovery of a new interstellar absorption feature at lambda = 2800A [PREPRINT-86] N83-27944
INTRAVENOUS PROCEDURES
Bio-medical flow sensor — intrvenous procedures [NASA-CASE-MSC-18761-1] N83-27577
INVERSIONS
An analysis of the Wyngaard-LeMone model of refractive index and micrometeorological structure functions at the top of a turbulent mixed layer [AD-A123986] N83-27548
INVERTED CONVERTERS (DC TO AC)
Isolation transformers for utility-interactive photovoltaic systems [DE83-006914] N83-27140
INVISCID FLOW
Aircraft aerodynamic prediction method for V/STOL transition including flow separation [NASA-CR-166467] N83-26818
IODIDES
Place of HgI2 energy-dispersive X-ray detectors [DE82-017651] N83-27193
Influence of temperature upon elastic limit and dislocation mobility of single-crystal HgI2 [DE82-017694] N83-27266
Synthetic studies of antimony sulfur iodide and predictions/synthesis of new nitrogen containing crystal structures [AD-A124977] N83-27881
ION ACCELERATORS
Variable-energy drift-tube linacs N83-27764
Review of induction linacs N83-27769
ION BEAMS
Ion-channelling effects in scanning ion microscopy with a Ga+ probe N83-27709
Status of the Argonne superconducting-linac heavy-ion booster N83-27730
Octupole focusing in transport and acceleration systems N83-27731
Beam dynamics in heavy ion induction linacs N83-27750
Computer simulation of longitudinal-transverse space charge effects in bunched beams N83-27751
Beam parameter measurements for the SLAC linear collider N83-27753
Funneling of heavy ion beams N83-27759
Numerical simulations for intense light-ion beam propagation in channel under influence of plasma inertia [IPPJ-627] N83-27854
Inertial fusion research based on pulsed power [DE82-018294] N83-27863
Database automation of accelerator operation [DE82-017525] N83-27915
ION EXCHANGING
Retention and recycling of plasma-edge hydrogen isotopes in C and TiC [DE82-019959] N83-27814
Ion-exchange behavior of alkali metals on treated carbons [DE83-005980] N83-27835
ION INJECTION
The Livermore MTA Project and its influence on modern linacs N83-27725
A 750 keV RFQ linac for the AGS polarized proton program N83-27788
New formulation of the RFQ radial matching section N83-27789
ION IRRADIATION
Error analysis and prevention of cosmic ion-induced soft errors in static CMOS RAMS [DE82-018967] N83-27610
ION MICROSCOPES
Ion-channelling effects in scanning ion microscopy with a Ga+ probe N83-27709
ION SOURCES
The Livermore MTA Project and its influence on modern linacs N83-27725
Preaccelerator design and component development for the SNQ linear accelerator N83-27734
Low frequency RFQ linacs for heavy ion fusion N83-27767
Ion source development and injector design for Zebra N83-27776
IONIC COLLISIONS
Interaction of hydrogen molecular ions with thin foils. Part 1: Convoy electrons N83-27721
Emission of high-energy, light particles from intermediate-energy heavy-ion reactions [DE82-017403] N83-27815
The role of rotational degrees of freedom in heavy-ion collisions [DE82-015751] N83-27820
IONIC MOBILITY
The stopping power of an electron gas for slow ions N83-27708
Energetic-ion acceleration and transport in the upstream region of Jupiter: Voyager 1 and 2 [NASA-TM-85179] N83-27946
IONIC REACTIONS
Emission of high-energy, light particles from intermediate-energy heavy-ion reactions [DE82-017403] N83-27815
IONIZATION
Electrofluid dynamics: The role of Hans von Ohain N83-26788
Ionization by fast charged particles [DE82-014849] N83-27823
Investigation of the potential functions of weakly bound diatomic molecules and laser-assisted excitive Penning ionization [DE82-017259] N83-27833

IONIZERS
Particle analyzing method and apparatus
[NASA-CASE-NPO-15292-1] N83-27184
IONIZING RADIATION
Morphological effects of chronic action of SHF field on nervous system of mice N83-27574
IONOSPHERE
Equatorial electrojet movements at Huancayo and Eusebio (Fortaleza) on selected quiet days
[INPE-2740-PRE/319] N83-27521
IONOSPHERIC ELECTRON DENSITY
Use of the VHF signal of the Sirio satellite for ionospheric investigations N83-27533
IONS
Charge States and Dynamic Screening of Swift Ions in Solids
[DE83-006799] N83-27697
Mean excitation energies for use in Bethe's stopping-power formula N83-27703
Empirical stopping powers for ions in solids N83-27706
The stopping power of an electron gas for slow ions N83-27708
Stopping of swift ions in condensed matter: The theory of effective charge N83-27714
Effective charge of energetic ions in metals N83-27715
IRON
New catalysts for the indirect liquefaction of coal
[DE82-017190] N83-26971
Passive films, surface structure and stress corrosion and crevice corrosion susceptibility
[AD-A124879] N83-26995
High-temperature corrosion of iron in sulfur-containing atmosphere
[DE83-006965] N83-27007
IRON ALLOYS
Aging response of a welded iron-based superalloy
[DE83-005856] N83-27005
Ultrasonic wave attenuation spectra in steels
[AERE-R-10753] N83-27808
IRRADIANCE
Beer's-law-based, simple spectral model for direct normal and diffuse horizontal irradiance
[DE83-008132] N83-27526
IRRADIATION
An investigation of the dynamics of the plasma corona
[DE82-019397] N83-27867
ISIS-A
Ordinary mode auroral kilometric radiation, with harmonics, observed by ISIS 1
[NASA-TM-85036] N83-27517
ISOMERS
The ISOLR: An isometric plotting package for use with ORPLOT
[DE82-015819] N83-27627
Laser-optical studies of the spontaneous-fission isomer /sup 240m/Am
[DE82-017433] N83-27817
ISOTHERMAL PROCESSES
Effects of ageing on the ductile-fracture mechanism in a high-strength low-alloy steel (300M)
[AERE-R-10783] N83-27015
ISOTOPE EFFECT
Gamma-ray for simultaneous calorimetric assay
[DE82-008615] N83-27826
ISOTOPES
Air pollution dry deposition: Radioisotopes as particles and volatiles N83-27494
ISOTOPIC LABELING
Radiolabelling of chemicals
[DE82-017576] N83-26949
ITERATION
A note on adaptive wind tunnels with imperfect control N83-26792
A 15-meter deployable aperture microwave radiometer N83-26862
Some remarks on the continuation method of Leray-Schauder-Rabinowitz and the method of monotone iterations
[AD-A125267] N83-27645
Use of the regularization method for designing the equilibrium system of a Tokamak reactor having a specified plasma geometry
[BLL-CTO-2117-(9091.9F)] N83-27851
ITERATIVE SOLUTION
Three-dimensional wave propagation using boundary integral equation techniques
[AD-A124956] N83-27103
Spectral analysis with an exponential window iterative method: The performance of the signal frequency evaluation --- voice signal processing
[FUB-15-1982] N83-27116
Recent developments in algorithms and software for trust-region methods
[DE83-006276] N83-27667

J

JAMMING
The performance of a PN spread spectrum receiver preceded by an adaptive interference suppression filter
[AD-A124903] N83-27098
JET AIRCRAFT NOISE
JT15D 1/2-scale nozzle jet noise experiment and comparison with prediction
[NASA-TM-83370] N83-27793
AICUZ (Air Installation Compatible Use Zone) report
[AD-A124974] N83-27801
JET ENGINE FUELS
High altitude jet fuel photochemistry
[AD-A125035] N83-27035
Thermodynamics of organic compounds
[AD-A125022] N83-27895
JET FLOW
Experimental investigation of the mixing of highly swirling flows
[AD-A125249] N83-27160
Flash evaporation from turbulent water jets
[DE83-007311] N83-27168
Experimental investigation of jets in a cross flow --- turbulent flow
[KU-SFB-80/E/219] N83-27177
An instrument for measuring dynamic surface tension --- jet flow
[VTT-140] N83-27198
JET PROPULSION
Some historical trends in the research and development of aircraft
[NASA-TM-84665] N83-26785
A collection of papers in the aerospace sciences
[AD-A122667] N83-26787
JOINTS (ANATOMY)
A finite element analysis of the creep response of lumbar intervertebral joints in the Rhesus monkey
[AD-A124740] N83-27570
JOINTS (JUNCTIONS)
Moment-rotation characteristics of semi-rigid steel beam-column connections
[PB83-145318] N83-27081
Joint opening nonlinear mechanism: Interface smeared crack model
[PB83-149195] N83-27084
Low energy 100 percent duty factor Alvarez linacs at Chalk River N83-27726
JP-4 JET FUEL
Coaxial dump combustor investigations N83-26791
JUPITER ATMOSPHERE
Energetic-ion acceleration and transport in the upstream region of Jupiter: Voyager 1 and 2
[NASA-TM-85179] N83-27946

K

KALMAN FILTERS
Enhanced tracking of airborne targets using a correlator-Kalman filter
[AD-A124884] N83-27097
KANSAS
Development of techniques for producing static strata maps and development of photointerpretive methods based on multitemporal LANDSAT data
[E83-10081] N83-27284
KEROSENE
Autoignition of kerosene/oxygen mixtures in a fluidized bed
[DE82-016376] N83-26952
Thermodynamics of organic compounds
[AD-A125022] N83-27895
KINEMATIC EQUATIONS
State space models of the Nash cascade: Kinematic and diffusion waves --- dynamic hydrology systems
[TULEA-1981-14] N83-27341
KINEMATICS
Systems design and comparative analysis of large antenna concepts N83-26863
General relations for exact and inexact involute bodies of revolution
[AD-A124849] N83-27201
Rolling-element bearings
[NASA-RP-1105] N83-27214
KINETIC ENERGY
Electrofluid dynamics: The role of Hans von Ohain N83-26788
Inertial fusion research based on pulsed power
[DE82-018294] N83-27863
KINETICS
Thermal Desorption Spectroscopy (TDS) of hydrogen from niobium
[DE82-012024] N83-26981
Kinetics of hydrogen-induced stress corrosion cracking. Part 1: Important features of cracking with regard to high strength steels
[BLL-RISLEY-TRANS-4701(9091.9F)] N83-26990
Kinetics of void formation in strained metals
[ISSN-0208-5658] N83-26993

L

LABORATORIES
A visit to the Computer Science Department
[AD-A124855] N83-27607
LACTATES
Recovery from short term intense exercise: Its relation to capillary supply and lactate release
[AD-A124965] N83-27584
LAMELLA (METALLURGY)
Relationship between structure and impact strength in as-solidified welds of mild and low alloy steels
[BLL-DRIC-T-6775-(3623.66)] N83-27251
LAMINAR FLOW
Deposition of aerosols in sampling tubes
[DE82-017311] N83-27062
LAMINATES
Transient heat flow along uni-directional fibers in composites
[AD-A122926] N83-26929
A study of the stress wave factor technique for the characterization of composite materials
[NASA-CR-3670] N83-27248
Bending of laminated anisotropic shells by a shear deformable finite element
[PB83-145409] N83-27278
The stress distribution round an infinite row of circular holes in an orthotropic plate
[PB83-147157] N83-27279
Fabrication of low-cost Mod-0A wood composite wind turbine blades
[NASA-TM-83323] N83-27347
LAND MOBILE SATELLITE SERVICE
Large spaceborne antenna technology: A system perspective N83-26854
Land mobile satellite system requirements N83-26855
Satellite systems requirements for land mobile communications N83-26856
Systems design and comparative analysis of large antenna concepts N83-26863
Large space antenna communications systems: Integrated Langley Research Center/Jet Propulsion Laboratory technology development activities. 1: Introduction N83-26891
Large space antenna communications systems: Integrated Langley Research Center/Jet Propulsion Laboratory development activities. 3: Jet Propulsion Laboratory activities N83-26893
LAND USE
Mapping of land use and geomorphology in the APAPORE project area by LANDSAT satellite data, volume 2
[E83-10333] N83-27281
Mapping of land use and geomorphology in the APAPORE project area by LANDSAT satellite data, volume 3
[E83-10334] N83-27282
Evaluation of ground cover and land use in the PDRI-AM remote sensing technique program area --- Brazil
[E83-10230] N83-27283
Development of techniques for producing static strata maps and development of photointerpretive methods based on multitemporal LANDSAT data
[E83-10081] N83-27284
LANDSAT 4 investigations of thematic mapper and multispectral scanner applications
[E83-10301] N83-27292
Wildland inventory and resource modeling for Douglas and Carson City Counties, Nevada, using LANDSAT and digital terrain data
[E83-10302] N83-27293
Australia ground data collection 1981-82 crop year, appendixes A and B, volume 2
[E83-10316] N83-27305
Australia ground data collection 1981-82 crop year, volume 1
[E83-10317] N83-27306
Monitoring land degradation in southern Tunisia: A test of LANDSAT imagery and digital data
[E83-10320] N83-27308
The classification of LANDSAT data for the Orlando, Florida, urban fringe area
[E83-10327] N83-27311
Effects of autocorrelation upon LANDSAT classification accuracy --- Richmond, Virginia and Denver, Colorado
[E83-10328] N83-27312

Mapping of land use and geomorphology in the APAPORE project area by LANDSAT satellite data, volume 1
[E83-10332] N83-27314
Remote Sensing techniques used to characterize soil erosion in southwestern Sao Paulo state — Brazil
[E83-10339] N83-27315
Satellite monitoring of vegetation and geology in semi-arid environments — Tanzania
[E83-10343] N83-27318
Study on spectral/radiometric characteristics of the thematic mapper for land use applications
[E83-10348] N83-27323
AICUZ (Air Installation Compatible Use Zone) report
[AD-A124974] N83-27801

LANDSAT SATELLITES
Earth observation system: Spacecraft design N83-26861
Mapping from space and the SPOT project N83-27477

LANDSAT 4
LANDSAT-D data format control book. Volume 6, appendix C: Partially processed multispectral scanner high density tape (HDT-AM)
[E83-10274] N83-27286
LANDSAT-D flight segment operations manual, volume 1
[E83-10285] N83-27287
LANDSAT-D flight segment operations manual, volume 2
[E83-10286] N83-27288
LANDSAT-D flight segment operations manual. Appendix A: Coefficients/calibration data
[E83-10287] N83-27289
LANDSAT-D flight segment operations manual. Appendix B: OBC software operations
[E83-10288] N83-27290
LANDSAT-4 to ground station interface description
[E83-10292] N83-27291
LANDSAT 4 investigations of thematic mapper and multispectral scanner applications
[E83-10301] N83-27292
Study of LANDSAT-D thematic mapper performance as applied to hydrocarbon exploration — Southern Ontario, Lawton, Oklahoma; Owl Creek, Wyoming; Washington, D.C.; and Death Valley California
[E83-10325] N83-27310
Geometric accuracy of LANDSAT-4 MSS image data
[E83-10347] N83-27322
Study on spectral/radiometric characteristics of the thematic mapper for land use applications
[E83-10348] N83-27323

LARGE SPACE STRUCTURES
Large Space Antenna Systems Technology, part 1
[NASA-CP-2269-PT-1] N83-26853
Large deployable reflector: An infrared and submillimeter orbiting observatory N83-26858
Pushbroom radiometry and its potential using large space antennas N83-26860
Large space systems auxiliary propulsion requirements N83-26864
A summary of mission and system performance requirements for large space antennas N83-26865
Advances in structural concepts N83-26868
Manned assembly of space structures N83-26869
NASA/USAF research in structural dynamics N83-26870
Structures for large precision reflectors N83-26871
Wrap-rib antenna concept development overview N83-26873
Hoop/column antenna development program N83-26874
Status of deployable geo-truss development N83-26875
Box truss development and applications N83-26876
Large Space Antenna Systems Technology, part 2
[NASA-CP-2269-PT-2] N83-26879
Control of large space antennas N83-26880
Enabling technologies for large precision space systems N83-26881
Reduced order control design for large space structures: A communication satellite example N83-26882
Current status of system identification methodology N83-26883
Computer analysis and ground testing of large space systems control strategies N83-26884
Shape determination/identification for large space antennas N83-26885
Practical approaches to the design of control systems for large space structures N83-26886
Results of studies at Langley Research Center on the control of large space systems N83-26887
The need for space flight experiments and testing in the development of large space antenna systems technology N83-26898
A robot in space as a large space structures control experiment N83-26899
Space Technology Experiment Platform (STEP). A Shuttle-borne support facility for structures, structural dynamics, and control technology flight experiments N83-26901
Safe on-orbit experiment for measurement of large structures dynamics N83-26902
MAST space research flight experiment N83-26904
A large antenna system flight experiment N83-26905
SADE: A space experiment to demonstrate structural assembly N83-26906
Development of deployable structures for large space platform systems, volume 1
[NASA-CR-170689] N83-26919
Auxiliary propulsion requirements for large space systems
[NASA-TM-83386] N83-26922
Potential of minicomputer/array-processor system for nonlinear finite-element analysis
[NASA-TM-84566] N83-27259

LASER ANEMOMETERS
Development of a simplified optical technique for the simultaneous measurement of particle size distribution and velocity
[NASA-TP-2185] N83-27846

LASER APPLICATIONS
A NASA high-power space-based laser research and applications program
[NASA-SP-464] N83-27200
Laser marking of component parts
[DE83-006728] N83-27208
Laser safety of air bathymetry
[FOA-C-30292-E1] N83-27210

LASER DOPPLER VELOCIMETERS
Wind tunnel investigation of separated flow over an afterbody in supersonic axisymmetric stream utilizing one-component laser-Doppler-velocimetry
[FFA-TN-1983-10] N83-26826

LASER FUSION
Brillouin backscatter from gas-jet targets illuminated by a multi-line laser source
[DE82-012586] N83-27206

LASER HEATING
Thermoelastic response to a short laser pulse
[AD-A125247] N83-27203
Melt depth and regrowth kinetics in pulsed laser annealing of silicon and gallium arsenide
[DE83-005192] N83-27205

LASER INTERFEROMETRY
Feasibility study of three-dimensional holographic interferometry for aerodynamics
[NASA-CR-166483] N83-27845

LASER OUTPUTS
Degradation of a laser beam by a turbulent jet N83-26799

LASER PLASMA INTERACTIONS
Plasma laser accelerator: Longitudinal dynamics, the plasma/laser interaction, and a qualitative design
[DE82-014986] N83-27870

LASER PLASMAS
An investigation of the dynamics of the plasma corona
[DE82-019397] N83-27867

LASER PROPULSION
A NASA high-power space-based laser research and applications program
[NASA-SP-464] N83-27200

LASER PUMPING
A NASA high-power space-based laser research and applications program
[NASA-SP-464] N83-27200

LASER SPECTROSCOPY
The FO2 radical and Laser Magnetic Resonance (LMR) spectra in reactions of fluorine atoms
[MPIS-19/1982] N83-26985

LASER TARGETS
Brillouin backscatter from gas-jet targets illuminated by a multi-line laser source
[DE82-012586] N83-27206
An investigation of the dynamics of the plasma corona
[DE82-019397] N83-27867

LASER WELDING
Welding technologies and materials for energy applications in Japan N83-27218
Laser welding of structural alloys N83-27228

LASERS
Collector trade-off study for BDM PRDA-35 application
[DE82-013532] N83-27434
Laser measurements and nuclear structure
[DE82-017528] N83-27816
Plasma laser accelerator: Longitudinal dynamics, the plasma/laser interaction, and a qualitative design
[DE82-014986] N83-27870

LATERAL CONTROL
Lateral flying qualities of highly augmented fighter aircraft, volume 1
[AD-A118070] N83-26835

LATHES
Automatable tool system for turning operations
[PNR-90166] N83-27077

LATTICES (MATHEMATICS)
Application of the vortex-lattice method to propeller performance analysis
[AD-A124837] N83-26840

LAUNCH VEHICLES
Land mobile satellite system requirements N83-26855
Estimation of launch vehicle performance parameters from 2 orbiting sensors
[AD-A124802] N83-26907

LAYOUTS
Matching based interactive facility layout
[AD-A124958] N83-27609

LEAD ACID BATTERIES
Reseach, development, and demonstration of lead-acid batteries for electric vehicle propulsion
[DE82-016225] N83-27467
Cost/design study and fabrication/testing of a 300-W gas-recombination device for utility lead-acid cells
[DE82-019800] N83-27468

LEAD OXIDES
Flame optimization for the spectroscopic analysis of the chemiluminescence from lead oxide
[AD-A124825] N83-26937

LEAR JET AIRCRAFT
Aircraft accident report: IBEX Corporation Gates Learjet 23, N100TA, Atlanta, near Savannah, Georgia, 6 May 1982
[PB83-910401] N83-26827

LEAST SQUARES METHOD
Motion estimation based on multiple local constraints and nonlinear smoothing
[AD-A124838] N83-27640
Comparison of estimators of beta parameters for fitting binomial data with varying p
[DE83-006641] N83-27690

LENSES
Experimental studies of electron beam focusing with solenoid lenses near the space charge limit N83-27772

LEPTONS
Proceedings of the Los Alamos Neutrino Workshop
[DE83-000427] N83-27812

LEVEL (QUANTITY)
Subtle consequences of exposure to weak microwave fields: Are there non-thermal effects?
[AD-A125169] N83-27090

LIBYA
Libya, Algeria and Egypt: Crude oil potential from known deposits
[DE82-018578] N83-27334

LIE GROUPS
Lie algebras and flexible lie-admissible algebras. Hadronic press monographs in mathematics number 1
[DE83-007252] N83-27694

LIFE (DURABILITY)
First flight test of Chinese electron rocket is successful N83-26926
Nondestructive inspection and evaluation of composite-material flywheels
[DE82-015379] N83-26930
Potential of composite materials in surface transportation applications
[DE83-007218] N83-26931
Analysis of elevated-temperature tensile and creep properties of normalized and tempered 2-1/4 Cr-1 Mo steel
[DE82-018160] N83-27010
Modulator reliability and bandwidth improvement: Replacing tetrodes with MOSFETs N83-27783

LIFE CYCLE COSTS
Cost analysis of Navy acquisition alternatives for the NAVSTAR Global Positioning System
[AD-A125017] N83-26909

LIFT
Investigation of the coupling of unsteady lift to low order acoustic duct modes in an axial flow fan
[AD-A124819] N83-27796

LIGHT CURVE
Bump masses for BL Her stars
[DE83-019564] N83-27943

LIGHT IONS
Numerical simulations for intense light-ion beam propagation in channel under influence of plasma inertia
[IPPJ-627] N83-27854
Inertial fusion research based on pulsed power
[DE82-018294] N83-27863

LIGHT SCATTERING
Elastic constants of plastic crystals by Schaefer-Bergmann scattering: Crystalline cyclohexane and deuteromethane
[DE82-018660] N83-27885
LIGHT WATER REACTORS
Materials and welding process development for nuclear application in the Federal Republic of Germany N83-27217
LIGHTING EQUIPMENT
Proceedings of the Lightning-Electromagnetic Compatibility Conference
[DE83-005707] N83-27104
Conducted and radiated signatures of fluorescent lamp systems in C and I environments N83-27108
EMI measurements of lightning systems N83-27109
LIGHTNING
Aircraft lightning-induced voltage test technique developments
[NASA-CR-170403] N83-26829
RF radiation from lightning correlated with aircraft measurements during storm hazards-82
[NASA-TM-85007] N83-27537
LIMBS (ANATOMY)
Apparatus for determining changes in limb volume
[NASA-CASE-MSC-18759-1] N83-27578
LIMESTONE
Pneumatic conveying of coal and coal-limestone mixtures as applied to atmospheric fluidized-bed combustion
[DE82-015694] N83-27243
Sulfur control in fluidized-bed combustors: Methodology for predicting the performance of limestone and dolomite sorbents
[DE83-007658] N83-27500
LIMITERS (FUSION REACTORS)
Experimental studies on pump limiters
[DE82-017408] N83-27868
LIMITS (MATHEMATICS)
Submodular set functions, amtroids and the greedy algorithm: Tight worst-cast bounds and some generalizations of the Rado-Edmonds theorem
[AD-A124981] N83-27671
LINE SPECTRA
Interaction of hydrogen molecular ions with thin foils. Part 2: Balmer emission N83-27722
LINEAR ACCELERATORS
A free electron laser driven by a long pulse induction linac
[AD-A125221] N83-27202
Proceedings of the 1981 Linear Accelerator Conference
[DE82-013754] N83-27724
The Livermore MTA Project and its influence on modern linacs N83-27725
Low energy 100 percent duty factor Alvarez linacs at Chalk River N83-27726
Status report on operation and upgrading of the Unilac N83-27727
The linear accelerator for the proposed German spallation source N83-27728
Status of the Argonne superconducting-linac heavy-ion booster N83-27730
Octupole focusing in transport and acceleration systems N83-27731
Matching the RF quadrupole beam to the drift tube section in the FMIT accelerator N83-27732
Dead beat filling and feedforward RF control for the spallation neutron source SNQ N83-27733
Preaccelerator design and component development for the SNQ linear accelerator N83-27734
A beam cavity interaction computer code for linacs N83-27735
Loss monitors for the Fermilab linac N83-27737
Construction of a high-power RF resonant test load N83-27740
Tuning experience with the FMIT scale-model drift-tube linac N83-27741
Effects of radial support stems on the disk-and-washer structure N83-27743
A FRQ concept using circular rods N83-27744
First results on BNL H- MEQALAC — multiple-beam electrostatic quadrupole array linear accelerator N83-27746
Cavity loading associated with high-current RF linacs N83-27754
The 1981 Linear Accelerator Conference on Proton Beam Emittance Growth in Linac N83-27755
Statistical treatment of misalignments in linear accelerators N83-27757
The RF system of the photon factory injector linac N83-27761
Post coupler studies for Alvarez tanks to be used for high power or variable energy N83-27763
Variable-energy drift-tube linacs N83-27764
Variable energy standing wave linear accelerator structure N83-27765
Loop coupling to a Radio Frequency Quadrupole resonator (RFQ) N83-27766
Low frequency RFQ linacs for heavy ion fusion N83-27767
Review of induction linacs N83-27769
The image displacement instability in radial line accelerators N83-27777
Design of an electron beam spectral modification system N83-27779
Longitudinal beam optimization of the Argonne superconducting heavy-ion liner accelerator N83-27780
Low-cost megawatt RF power sources for linear accelerators to 70MHz and above
[LBL-13024] N83-27784
Measurement of model inter-digital H type linac N83-27786
An RFQ linac for heavy ion acceleration N83-27787
Buncher section optimization of heavy ion RFQ linacs N83-27790
LAMPF transition region
[DE82-019489] N83-27824
LINEAR EQUATIONS
Linear problem of inductor synthesis for a Tokamak thermonuclear apparatus
[BLL-CTO-2116-(9091.9F)] N83-27852
LINEAR PREDICTION
Frequency charts using an iterative signal processing method — voice signal processing
[FUB-16-1982] N83-27117
LINEAR PROGRAMMING
FORTRAN based linear programming for microcomputers
[AD-A124804] N83-27605
LINEAR SYSTEMS
Finite element methods for linear hyberbolic problems
[CTH-MATH-1983-4] N83-27674
LINEARITY
Numerics of measuring residual stresses in near-surface layers by means of X-ray diffraction analysis. Part 1: Constant and inclined stress distribution
[NRC/CNR-TT-2060] N83-27258
Beam parameter measurements for the SLAC linear collider N83-27753
LINES (GEOMETRY)
Using pyramids to detect good continuation
[AD-A124848] N83-27616
LINGUISTICS
NIGEL: A systemic grammar for text generation
[AD-A125253] N83-27622
LINKS (MATHEMATICS)
Automatic generation of adequate graphs with given connectivity conditions
[FUB-20-1982] N83-27119
LIQUID ATOMIZATION
Injection, atomization, ignition and combustion of liquid fuels in high-speed air streams
[AD-A125237] N83-27033
LIQUID BEARINGS
The performance and application of high speed long life LH2 hybrid bearings for reusable rocket engine turbomachinery
[NASA-TM-84317] N83-26923
LIQUID FUELS
Injection, atomization, ignition and combustion of liquid fuels in high-speed air streams
[AD-A125237] N83-27033
Development of a biochemical process for production of alcohol fuel from peat
[DE82-016692] N83-27039
Biological production of liquid fuels from biomass
[DE82-008652] N83-27048
Hydropyrolysis of biomass and related materials for the production of liquids
[DE82-012928] N83-27402
Automotive Stirling Engine Development Program
[NASA-CR-168074] N83-27925
LIQUID HYDROGEN
The performance and application of high speed long life LH2 hybrid bearings for reusable rocket engine turbomachinery
[NASA-TM-84317] N83-26923
LIQUID INJECTION
Soot formation in synthetic-fuel droplets
[DE82-018420] N83-26958
Liquid-phase methanation/shift process development
[DE82-015214] N83-26961
Injection, atomization, ignition and combustion of liquid fuels in high-speed air streams
[AD-A125237] N83-27033
LIQUID METAL COOLED REACTORS
Welding equipment and process development for inaccessible tube-to-tubesheet welding on a sodium-heated steam generator N83-27236
LIQUID METAL FAST BREEDER REACTORS
Measurement of the carbon activity of sodium with foils consisting of Fe-20Mn and stainless steel types A304L and 316L
[BLL-RISLEY-TRANS-4719(9091.9F)] N83-26989
LIQUID METALS
DRAC: A user-friendly computer code for modeling transient thermohydraulic phenomena in solar-receiver tubing
[DE83-007091] N83-27458
LIQUID NITROGEN
Concept evaluation of automotive propulsion using liquid air/nitrogen
[DE82-016992] N83-27927
LIQUID SODIUM
Measurement of the carbon activity of sodium with foils consisting of Fe-20Mn and stainless steel types A304L and 316L
[BLL-RISLEY-TRANS-4719(9091.9F)] N83-26989
LIQUID SURFACES
Discussions with Jens
[DE82-016622] N83-27896
LIQUID WASTES
Figure-of-merit analysis and cost effectiveness of low-level radioactive waste treatment systems
[DE82-018890] N83-27836
LIQUID-VAPOR EQUILIBRIUM
A general approach to the testing of binary solubility systems for thermodynamic consistency. Consolidated Fuel Reprocessing Program
[DE83-007173] N83-27897
LIQUIDS
A method for determining liquid volatility at ambient temperatures using an infrared gas analyzer
[AD-A124906] N83-26940
LITHIUM SULFUR BATTERIES
Lithium/SO2 cathode studies
[DE82-012777] N83-27462
Improvements in Li(Si)/FeS2 thermal battery technology
[DE82-017779] N83-27463
LITHOLOGY
Geologic mapping of the Bauru Group in Sao Paulo state by LANDSAT images — Brazil
[E83-10341] N83-27316
The Ponta Grossa Arch: A proposal for ts configuration and evolution from the interpretation of remote sensing data
[E83-10343] N83-27320
LOAD DISTRIBUTION (FORCES)
Rolling-element bearings
[NASA-RP-1105] N83-27214
A procedure for combining acoustically induced and mechanically induced loads (first passage failure design criterion)
[NASA-CR-166824] N83-27795
LOAD TESTS
Moment-rotation characteristics of semi-rigid steel beam-column connections
[PB83-145318] N83-27081
LOADS (FORCES)
Assessment of the quality of bearing steel from its inclusion content
[BLL-M-26906-(5828.4)] N83-26991
Multiaxial creep of 2618 aluminum under proportional loading steps
[AD-A125023] N83-26997
Mean wave drift forces: Theory and experiment — water waves
[NMI-R-124] N83-27146
Interference effects on the drag loading for groups of cylinders in uni-directional flow — water waves, offshore structures
[NMI-R-130] N83-27147
Phase variation in wave force data — offshore structures
[NMI-R-132] N83-27253
Wave forces on circular cylinders with large excrescences at low Keulegan and Carpenter numbers — water waves
[NMI-R-133] N83-27254
A comparison of two methods for calculating wave drift forces — water waves, offshore structures
[NMI-R-137] N83-27255
Papers on techniques of program design
[ISSN-0208-5658] N83-27613
LOGARITHMS
A calculation of wrinkled flames
[AD-A125258] N83-26943
LOGIC DESIGN
Concepts evaluation model V input-data system
[AD-A124891] N83-27908
LONG TERM EFFECTS
Large Space Antenna Systems Technology, part 1
[NASA-CP-2269-PT-1] N83-26853

LOOPS
Current status of system identification methodology N83-26883
Construction of a high-power RF resonant test load N83-27740
Design considerations for a developmental high power coupling loop to drive a resonant load N83-27762
LOW FREQUENCIES
Lithium/SO2 cathode studies
[DE82-012777] N83-27462
Properties of a 0-mode RFQ structure and recent experimental results N83-27748
Low frequency RFQ linacs for heavy ion fusion N83-27767
LOW PRESSURE
Downhole steam-generator study. Volume 1: Conception and feasibilty evaluation
[DE82-018348] N83-27424
LOW TEMPERATURE PHYSICS
Thermal conductance of pressed contacts at liquid helium temperatures
[NASA-TM-84365] N83-27876
LOW THRUST
The plasma powerplant N83-26927
LOW VISIBILITY
Atmospheric conditions influencing slant path low visibility
[AD-A116109] N83-27847
LUBRICANTS
Method for milling and drilling glass
[NASA-CASE-GSC-12636-1] N83-27058
LUMINANCE
The VDU operators' preferred environmental conditions in a telephone information center --- video display device luminance
[TULEA-1982-11] N83-27603
LUMINOSITY
Anode phenomena in vacuum arcs
[DE83-007181] N83-27141
Upper limits to the annihilation radiation luminosity of Centaurus A N83-27933
LUMINOUS INTENSITY
Determining light intensity for use with intermittent or rotating prism cameras utilizing a cinematographic light-intensity translator
[DE82-015414] N83-27189
Beam parameter measurements for the SLAC linear collider N83-27753
Bump masses for BL Her stars
[DE83-019564] N83-27943
LUMPED PARAMETER SYSTEMS
The lumped mass finite element method for a parabolic problem
[CTH-MATH-1983-1] N83-27672
LUTETIUM COMPOUNDS
The rare earth sulfides R2S/sub 3-x/(R = Sc, Er and Lu) as high temperature thermoelectric elements
[DE82-016382] N83-27396

M

MACH NUMBER
Heat-transfer distributions on biconics at incidence in hypersonic-hypervelocity He, N2, air, and CO2 flows
[NASA-TM-84667] N83-27150
Heating measurements on Space Shuttle Orbiter models with differentially deflected elevons
[NASA-TM-84646] N83-27151
MAGMA
Description and operating procedure for magma characterization data acquisition and control system
[DE82-015653] N83-27625
MAGNESIUM OXIDES
The extinction of starlight at wavelengths near 2200A --- by inorganic particles N83-27941
MAGNET COILS
Linear problem of inductor synthesis for a Tokamak thermonuclear apparatus
[BLL-CTO-2116-(9091.9F)] N83-27852
MAGNETIC CIRCUITS
Calorimeter for measuring ac magnetic losses in small samples
[DE82-018167] N83-27192
MAGNETIC DIPOLES
A variable strength permanent magnet dipole N83-27745
MAGNETIC FIELD CONFIGURATIONS
Stability and confinement of spheromaks and field-reversed configurations
[DE82-018376] N83-27862
Ideal MHD stability calculations in axisymmetric toroidal coordinate systems
[DE82-009830] N83-27866
MAGNETIC FIELDS
Electrofluid dynamics: The role of Hans von Ohain N83-26788
A free electron laser driven by a long pulse induction linac
[AD-A125221] N83-27202
Auroral kilometric radiation/aurora correlation
[NASA-TM-85035] N83-27516
Relationships between field-aligned currents, electric fields and particle precipitation as observed by dynamics Explorer-2
[NASA-TM-85025] N83-27519
USSR report: Life sciences. Effects of nonionizing electromagnetic radiation, no. 9
[JPRS-83601] N83-27572
Function of adreno-pituitary system in various regimes of effect of alternating magnetic field of industrial frequency N83-27576
Recent work on collective accelerators N83-27771
Experimental studies of electron beam focusing with solenoid lenses near the space charge limit N83-27772
The image displacement instability in radial line accelerators N83-27777
An analytical solution for the electrical properties of a Radio Frequency Quadrupole (RFQ) with simple vanes N83-27785
An RFQ linac for heavy ion acceleration N83-27787
A 750 keV RFQ linac for the AGS polarized proton program N83-27788
MAGNETIC INDUCTION
Review of induction linacs N83-27769
Linear problem of inductor synthesis for a Tokamak thermonuclear apparatus
[BLL-CTO-2116-(9091.9F)] N83-27852
MAGNETIC MATERIALS
Calorimeter for measuring ac magnetic losses in small samples
[DE82-018167] N83-27192
MAGNETIC MIRRORS
Research support for plasma diagnostic on Elmo Bumpy Torus. Observations of EBT ring geometry by means of diamagnetic field measurements using a compensated ferromagnetic resonance magnetometer, and a preliminary numerical study of EBT flux penetration dynamics
[DE83-007863] N83-27864
Future Engineering Needs of Magnetic Fusion
[PB83-149757] N83-27874
MAGNETIC MOMENTS
An NMR study of hydrogen diffusion in metal hydrides containing parametric impurities
[DE83-004859] N83-27890
MAGNETIC PROPERTIES
Effects of magnetic impurities on the apparent diffusion coefficient of hydrogen in metal hydrides deduced from NMR
[DE82-019124] N83-26979
Experimental characterization of the flux-line lattice in superconducting V3Si
[DE83-004647] N83-27888
MAGNETIC RESONANCE
The FO2 radical and Laser Magnetic Resonance (LMR) spectra in reactions of fluorine atoms
[MPIS-19/1982] N83-26985
MAGNETIC TAPES
LANDSAT-D data format control book. Volume 6, appendix C: Partially processed multispectral scanner high density tape (HDT-AM)
[E83-10274] N83-27286
MAGNETITE
Muon spin-rotation study on magnetite
[DE82-019535] N83-27834
MAGNETOHYDRODYNAMIC STABILITY
Plasma behaviors in the open field region of reversed-field theta-pinch
[IPPJ-624] N83-27856
Ideal MHD stability calculations in axisymmetric toroidal coordinate systems
[DE82-009830] N83-27866
MAGNETOHYDRODYNAMIC WAVES
Shear Alfven waves in Tokamaks
[DE83-007194] N83-27872
MAGNETOPLASMADYNAMICS
Aeronautical Knowledge (selected articles)
[AD-A123935] N83-26925
The plasma powerplant N83-26927
MAGNETRON SPUTTERING
New techniques for roll coating of optical thin film N83-27371
MAGNETRONS
High-average-power electron accelerators for generating gigawatt microwave pulses
[DE83-006808] N83-27821
MAGNETS
Design of REC permanent magnet quadrupoles taking into account B, H non-linearity N83-27770
Focussing considerations in the race track microtron and double-sided microtron N83-27774
Automatic beam-steering of the Mainz Microtron N83-27775
MAINTENANCE
The servicing of complex NC manufacturing systems --- numerical control (NC)
[PNR-90153] N83-27069
Welding practices in fossil-fired units N83-27219
Natural Bridges National Monument photovoltaic power plant operations manual
[DE82-015388] N83-27438
MAN MACHINE SYSTEMS
Production planning, production systems for flexible automation
[PNR-90150] N83-27067
Present situation in development of automated machining systems in Europe and America
[PNR-90152] N83-27068
The servicing of complex NC manufacturing systems --- numerical control (NC)
[PNR-90153] N83-27069
Time characteristic, capacity and conditions for the adoption of flexible production systems --- for metal working
[PNR-90156] N83-27071
Automatable tool system for turning operations
[PNR-90166] N83-27077
Development of a design automation graphics work station
[AD-A124824] N83-27618
Investigation into the availability levels of flexible production systems
[PNR-90157] N83-27902
Spelling correction in user interfaces
[AD-A125208] N83-27906
The continued design and implementation of a relational database system
[AD-A124927] N83-27912
MANAGEMENT INFORMATION SYSTEMS
The performance measurement of a relational database system using monitoring and modeling techniques
[AD-A124919] N83-27910
The continued design and implementation of a relational database system
[AD-A124927] N83-27912
MANAGEMENT PLANNING
Small computers in the federal government: Management is needed to realize potential and prevent problems
[GAO/AFMD-83-36] N83-27604
Implementation of planned change: A review of major issues
[AD-A125193] N83-27900
Project scheduling with resource considerations
[AD-A124938] N83-27901
MANEUVERABLE REENTRY BODIES
Post-flight trajectory reconstruction of a maneuvering reentry vehicle from radar measurements
[AD-A124805] N83-26852
MANUALS
Natural Bridges National Monument photovoltaic power plant operations manual
[DE82-015388] N83-27438
MANUFACTURING
Boron-containing fuel-rich HTBP propellants. Manufacturing, burning experiments and specific impulse calculations
[FOA-C-20483-D1] N83-27055
Engineering and manufacture of a high-efficiency, automatic defrosting refrigerator-freezer
[DE82-017480] N83-27065
Example of a planned and implemented flexible manufacturing system suitable for development in stages
[PNR-90154] N83-27070
High frequency, high power capacitor development
[NASA-CR-168035] N83-27127
Manufacturing Methods and Technology (MM&T) specifications for miniature cathode ray tube
[AD-A124954] N83-27131
Review of induction linacs N83-27769
MAPPING
Development of techniques for producing static strata maps and development of photointerpretive methods based on multitemporal LANDSAT data
[E83-10081] N83-27284
Mapping of land use and geomorphology in the APAPORE project area by LANDSAT satellite data, volume 1
[E83-10332] N83-27314
Mapping method for generating three-dimensional meshes: Past and present
[DE82-014077] N83-27664

MAPS
Mapping of land use and geomorphology in the APAPORE project area by LANDSAT satellite data, volume 2
[E83-10333] N83-27281
Mapping of land use and geomorphology in the APAPORE project area by LANDSAT satellite data, volume 3
[E83-10334] N83-27282
Mapping of land use and geomorphology in the APAPORE project area by LANDSAT satellite data, volume 1
[E83-10332] N83-27314
Bathymetric data and analysis for the NRL remote sensing experiment: Phelps Bank, July 1982
[AD-A125220] N83-27563
MARINE BIOLOGY
Terrestrial and riverine ecology N83-27482
MARINE METEOROLOGY
Report on the West Sole Wind Structure Project 1982 — wind profiles at a North Sea offshore platform
[NMI-R-145] N83-27535
MARINE RESOURCES
Pacific Northwest Laboratory report to the DOE Office of Energy Research. Part 2: Environmental sciences
[DE83-007586] N83-27481
MARKING
Laser marking of component parts
[DE83-006728] N83-27208
MARKOV PROCESSES
Development of procedures and algorithms for pattern recognition and image processing based on two-dimensional Markov models
[AD-A124917] N83-27682
Optimal smoothing and estimation for hybrid state processes
[AD-A124907] N83-27683
MARS SURFACE
Smectites versus palagonites in Mars soil: Evidence from simulations of Viking biology labeled release experiments
[NASA-TM-84361] N83-27947
MARTENSITIC STAINLESS STEELS
Materials and welding process development for nuclear application in the Federal Republic of Germany N83-27217
MARYLAND
Geology and mineral resources of the Baltimore 1 deg by 2 deg NTMS quadrangle, Maryland-Pennsylvania-Virginia N83-27328
MASKS
Process research on non-CZ silicon material
[NASA-CR-172604] N83-27381
MASS FLOW
Mass flow measurement of solids/gas stream using radiometric techniques
[DE82-017028] N83-27170
Aerodynamic research on Tipvane windturbines
[PB83-147413] N83-27476
MASS SPECTROMETERS
Interaction of hydrogen molecular ions with thin foils. Part 1: Convoy electrons N83-27721
MASS SPECTROSCOPY
Fundamental pyrolysis studies
[DE82-009808] N83-26969
Particle analyzing method and apparatus
[NASA-CASE-NPO-15292-1] N83-27184
New FORTRAN computer programs to acquire and process isotropic mass-spectrometric data
[DE82-019901] N83-27629
MASS TO LIGHT RATIOS
Bump masses for BL Her stars
[DE83-019564] N83-27943
MASS TRANSFER
Effects of hydrazine and pH on the corrosion of copper-alloy materials in AVT environments with oxygen
[DE83-901124] N83-27004
Application of a new version of the k-W model of turbulence to a boundary layer with mass transfer
[CFD/82/15] N83-27182
Ecological effects of coal conversion N83-27484
MASSACHUSETTS
Geology and mineral resources of the Boston 1 deg by 2 deg NTMS quadrangle, Massachusetts-New Hampshire N83-27329
Geology and mineral resources of the Providence 1 deg by 2 deg NTMS quadrangle, Connecticut-Massachusetts-Rhode Island N83-27331
MATCHING
Matching the RF quadrupole beam to the drift tube section in the FMIT accelerator N83-27732
MATHEMATICAL MODELS
Development of improved analytical models for mesh reflector surfaces N83-26895
Ignition and flame-propagation studies with adaptive numerical grids
[DE83-005462] N83-26976
Jet penetration of inerts and explosives
[DE83-003746] N83-27052
Integrated forecasting model, synthetic-fuels study. Volume 2: Model structure and input data
[DE82-905778] N83-27053
A turbulence model for depth-averaged equations of motion — water currents
[TULEA-1981-07] N83-27174
Turbulence models; a lecture course
[CFD/82/4-REV] N83-27180
General relations for exact and inexact involute bodies of revolution
[AD-A124849] N83-27201
Establishment of a center of excellence for applied mathematical and statistical research
[E83-10307] N83-27297
A computer program for the simulation of heat and moisture flow in soils
[E83-10342] N83-27317
Evaluation of trends in wheat yield models
[E83-10349] N83-27324
On the numerical prediction of vertical turbulent exchange in stratified flows — geophysical flows, saline water
[TULEA-1981-08] N83-27340
Addition of devolatilization equations to SYNTHANE computerized mathematical model
[DE83-006243] N83-27444
Modeling the turbulence structure of the adiabatic atmospheric boundary layer
[TULEA-1982-12] N83-27532
Prediction of nearshore wave transformation
[AD-A125104] N83-27561
Investigation of adaptive processes in peripheral blood using mathematical modeling methods N83-27575
A linearized, time dependent model of the heat transfer and thermoregulatory responses occurring upon immersion in cold water
[AD-A124972] N83-27586
The use of the Blake computer program to calculate thermodynamic properties of Australian-made gun propellants
[AD-A118605] N83-27615
User manual AQUASTOR: A computer model for cost analysis of aquifer thermal-energy storage coupled with district heating or cooling systems. Volume 2: Appendices
[DE82-013889] N83-27631
Protocol translation and translators for heterogeneous computer networks
[DE83-007379] N83-27636
Unsteady models, vectorial autoregressive models, and Levinson's algorithm
[ENST-D-82005] N83-27676
Some simple formulae for normal mode wave numbers, cutoff frequencies and the number of modes trapped by a sound channel
[AD-A124948] N83-27798
A local single particle self energy for the Hubbard model
[INPE-2736-PRE/316] N83-27810
Retention and recycling of plasma-edge hydrogen isotopes in C and TiC
[DE82-019959] N83-27814
Folding models for elastic and inelastic scattering
[DE82-017426] N83-27819
Query optimization in distributed databases
[AD-A124921] N83-27909
Correlating radio emissions with visible emissions from individual solar active regions
[AD-A124892] N83-27949
MATHIEU FUNCTION
Stability of an impact-loaded elastic column with two degrees of freedom
[TULEA-1981-05-T] N83-27270
MATRICES (CIRCUITS)
Automatic test generation using a matrix model of digital systems
[DE82-009988] N83-27693
MATRICES (MATHEMATICS)
A note on adaptive wind tunnels with imperfect control N83-26792
Papers on techniques of program design
[ISSN-0208-5658] N83-27613
MATRIX MATERIALS
Nondestructive inspection and evaluation of composite-material flywheels
[DE82-015379] N83-26930
MAXIMUM LIKELIHOOD ESTIMATES
Comparison of estimators of beta parameters for fitting binomial data with varying p
[DE83-006641] N83-27690
MEASURING INSTRUMENTS
An instrument for measuring dynamic surface tension — jet flow
[VTT-140] N83-27198
Calibration and related measurement service of the National Bureau of Standards
[PB83-151662] N83-27199
Interpretation of the physical oceanography of Georges Bank, volume 1
[PB83-149054] N83-27568
MECHANICAL DEVICES
Design and simulation of a unique signal mechanism
[DE82-011568] N83-27110
MECHANICAL DRIVES
Wellhead power production with a rotary separator turbine (RP 1196) N83-27376
MECHANICAL ENGINEERING
General mechanism analysis package
[DE82-008158] N83-27060
MECHANICAL IMPEDANCE
Improvement of fusion welding through modelling, measurement and real-time control N83-27226
Experimental investigation of a mechanical impedance gauge based on measurement of strains on a conical rod
[TULEA-1981-66-T] N83-27272
Determination of mechanical impedance through strain measurement on an impacted slender rod
[TULEA-1982-33-T] N83-27274
MECHANICAL MEASUREMENT
Experimental investigation of a mechanical impedance gauge based on measurement of strains on a conical rod
[TULEA-1981-66-T] N83-27272
MECHANICAL PROPERTIES
Mechanisms of damage accumulation in time-dependent cyclic deformation
[DE83-000993] N83-27002
Ultrasonic mixing of epoxy curing agents
[NASA-TM-85643] N83-27018
Role of amines in adhesion of polybutadiene to glass substrates. 1: Reactions of amines during peroxide curing of polybutadiene
[AD-A121685] N83-27027
Polymers in mechanical systems: Structure-property requirements
[DE83-005590] N83-27029
Development of improved plastic piping materials and systems for fuel gas distribution
[PB83-161109] N83-27079
Anode phenomena in vacuum arcs
[DE83-007181] N83-27141
A study of the stress wave factor technique for the characterization of composite materials
[NASA-CR-3670] N83-27248
Influence of temperature upon elastic limit and dislocation mobility of single-crystal HgI2
[DE82-017694] N83-27266
MELTING
Interaction of ceramics with molten materials during directed crystallization
[PNR-90155] N83-27030
Summer decay and retreat of a sea ice cover
[AD-A125124] N83-27560
MELTING POINTS
Ultrasonic mixing of epoxy curing agents
[NASA-TM-85643] N83-27018
MELTS (CRYSTAL GROWTH)
Polymers in mechanical systems: Structure-property requirements
[DE83-005590] N83-27029
Measurement of the thermodynamic quantities for the AG-S system by the EMF method
[NRC/CNR-TT-2062] N83-27892
MEMBRANE STRUCTURES
Electrostatically figured membrane reflectors: An overview N83-26878
Preparation, characterization, physical testing and performance of fluorocarbon membranes and separators
[NASA-CR-167880] N83-26936
MEMORY
Components of mental imagery representation
[AD-A124616] N83-27591
MERCURY COMPOUNDS
Place of HgI2 energy-dispersive X-ray detectors
[DE82-017651] N83-27193
Influence of temperature upon elastic limit and dislocation mobility of single-crystal HgI2
[DE82-017694] N83-27266
MESH
Mapping method for generating three-dimensional meshes: Past and present
[DE82-014077] N83-27664
MESONS
High-energy physics at Tufts University
[DE83-007503] N83-27840

MESOSCALE PHENOMENA
The impact of conventional surface data upon VAS regression retrievals in the lower troposphere
[NASA-TM-83987] N83-27522
METAL COATINGS
Hardfacing materials and processes for valve applications N83-27221
METAL CUTTING
Technological characteristics of creep-feed grinding. Raised cutting forces and reduced work piece temperatures, part 2
[PNR-90164-PT-2] N83-27075
METAL GRINDING
The beneficial effect of zirconium and calcium when jointly microalloyed with high speed steels
[BLL-M-26914-(5828.4)] N83-26992
Surface grinding at high power avoiding thermal edge zone damage
[PNR-90161] N83-27072
Creep feed (single path) and conventional (multi-path) grinding - surface structure and comparison
[PNR-90162] N83-27073
Creep-feed grinding: A modern variant of the plane surface grinding process
[PNR-90163] N83-27074
Technological characteristics of creep-feed grinding. Raised cutting forces and reduced work piece temperatures, part 2
[PNR-90164-PT-2] N83-27075
Design requirements for creep-feed grinders, part 3. Application of outside diameter creep-feed grinding, part 4
[PNR-90165-PT-3/4] N83-27076
The analysis of residual stresses according to the Phi Psi Xi method with data compensation through ellipses
[NRC/CNR-TT-2061] N83-27257
METAL HYDRIDES
Effects of magnetic impurities on the apparent diffusion coefficient of hydrogen in metal hydrides deduced from NMR
[DE82-019124] N83-26979
METAL MATRIX COMPOSITES
Fiber reinforced composite materials
[TULEA-1981-02] N83-26933
METAL OXIDE SEMICONDUCTORS
Automated C-V and Y omega meson curves for MOS device analysis
[DE82-014266] N83-27886
METAL PLATES
Electron beam welding for heavy section steel plates N83-27229
METAL SURFACES
NASA interdisciplinary collaboration in tribology. A review of oxidational wear
[NASA-CR-3686] N83-27021
METAL WORKING
Time characteristic, capacity and conditions for the adoption of flexible production systems --- for metal working
[PNR-90156] N83-27071
Automatable tool system for turning operations
[PNR-90166] N83-27077
METAL-METAL BONDING
Hardfacing materials and processes for valve applications N83-27221
METALLIC GLASSES
Stopping powers of Zr, Pd, Cd, In and Pb for 6.5 MeV protons and mean excitation energies N83-27698
METALLURGY
Some observations on the physical metallurgy of nickel alloy weld metals N83-27240
METALS
Stopping power of Ni, Ag, Au and Pb for approximately 7 MeV/n alpha-particles and carbon ions (Z 3/1 proportional deviation from the Bethe formula) N83-27702
Effective charge of energetic ions in metals N83-27715
METEORITES
Conference on Planetary Volatiles
[NASA-CR-172682] N83-27938
METEOROLOGICAL INSTRUMENTS
Interface unit for relative humidity measurement with dew point meter
[FOA-C-30309-E] N83-27556
METEOROLOGICAL PARAMETERS
Siting guidelines for utility application of wind turbines
[DE83-007428] N83-27393
Meteorological Effects of Thermal Energy Releases (METER) program
[DE83-008313] N83-27502
Meteorological tower data, Grand Junction Tailings Site, Colorado
[DE82-018919] N83-27555
Atmospheric conditions influencing slant path low visibility
[AD-A116109] N83-27847
METHANATION
Liquid-phase methanation/shift process development
[DE82-015214] N83-26961
METHANE
Methane recovery from horizontal holes in advance of mining
[DE82-017673] N83-27337
The feasibility of biogas production on farms
[DE83-007385] N83-27385
Laboratory tests at elevated pressures of a silane igniter system for in-situ coal gasification
[DE83-007217] N83-27450
Technical support for geopressured-geothermal-well activities in Louisiana
[DE83-005297] N83-27473
Elastic constants of plastic crystals by Schaefer-Bergmann scattering: Crystalline cyclohexane and deuteromethane
[DE82-018660] N83-27885
METHYL ALCOHOLS
Dissociated methanol test results
[DE82-013565] N83-27054
MICROCOMPUTERS
Convolution techniques in analytical electrochemistry
[DE82-018531] N83-26954
Small computers in the federal government: Management is needed to realize potential and prevent problems
[GAO/AFMD-83-36] N83-27604
FORTRAN based linear programming for microcomputers
[AD-A124804] N83-27605
A visit to the Computer Science Department
[AD-A124855] N83-27607
Interfacing a torsion pendulum with a microcomputer
[DE83-004032] N83-27792
Use of analytical mechanics in defining acoustic-test methodology
[DE82-018615] N83-27802
MICROELECTRONICS
Quantitative analysis of phosphosilicate glass films on silicaon wafers
[DE82-017642] N83-26953
Microcircuit radiation effects databank
[NASA-TM-85346] N83-27903
MICROMETEOROLOGY
Modeling the turbulence structure of the adiabatic atmospheric boundary layer
[TULEA-1982-12] N83-27532
An analysis of the Wyngaard-LeMone model of refractive index and micrometeorological structure functions at the top of a turbulent mixed layer
[AD-A123986] N83-27548
MICROORGANISMS
The extinction of starlight at wavelengths near 2200A. The 2.8 to 3.6 micron spectra of micro-organisms with varying H2O-ice content
[PREPRINT-85] N83-27940
MICROPROCESSORS
Design of a prototype universal network interface device using INTEL 8086 and 8089 16-bit microprocessors
[AD-A124834] N83-27606
A microprocessor-controlled bead puller for RF cavity measurements N83-27738
The distributed control system for the Fermilab 200 MeV Linac N83-27782
MICROSTRUCTURE
Sintering phenomena of non-oxide silicon compounds
[DE83-007332] N83-26932
Analysis of a failed spent-char transfer line from the IGT HYGAS coal-gasification pilot plant
[DE82-014906] N83-26947
A study of the effect of interrupted quenches on a thermomechanically processed high carbon steel
[AD-A124985] N83-26996
Use of microhardness to determine the strengthening and microstructural alterations of 14-MeV-neutron-irradiated metals
[DE82-014002] N83-27000
Aging response of a welded iron-based superalloy
[DE83-005856] N83-27005
Comparison of neutron and heavy-ion damage in a stable austenite
[DE82-017369] N83-27009
Substructure of a 16-8 2 GTA weld as observed through TEM N83-27224
The welding metallurgy of SA508 C1 II heat affected zones N83-27230
Relationship between structure and impact strength in as-solidified welds of mild and low alloy steels
[BLL-DRIC-T-6775-(3623.66)] N83-27251
MICROTRONS
Operating experience with MAMI 1 N83-27729
Evolution of the racetrack microtron control system N83-27760
Beam instabilities in race track microtrons N83-27773
Focussing considerations in the race track microtron and double-sided microtron N83-27774
Automatic beam-steering of the Mainz Microtron N83-27775
The design of double sided microtrons N83-27778
MICROWAVE AMPLIFIERS
High-average-power electron accelerators for generating gigawatt microwave pulses
[DE83-006808] N83-27821
MICROWAVE ANTENNAS
The effects of mesh reflecting surfaces upon radiometric measurements N83-26894
Development of improved analytical models for mesh reflector surfaces N83-26895
A survey of near-field testing methods for large aperture antennas and future trends N83-26896
Near-field measurement facility plans at Lewis Research Center N83-26897
MICROWAVE CIRCUITS
Design of active impedance microwave monolithic circuits with a GaAs substrate
[ENST-E-82012] N83-27143
MICROWAVE FREQUENCIES
On the numerical solution of some 2-D electromagnetic interface problems by the boundary collocation method
[AD-A125269] N83-27666
MICROWAVE RADIOMETERS
Pushbroom radiometry and its potential using large space antennas N83-26860
A 15-meter deployable aperture microwave radiometer N83-26862
The effects of mesh reflecting surfaces upon radiometric measurements N83-26894
MICROWAVE TRANSMISSION
Waveguide cooling system
[NASA-CASE-NPO-15401-1] N83-27085
MICROWAVES
Subtle consequences of exposure to weak microwave fields: Are there non-thermal effects?
[AD-A125169] N83-27090
Responses of airborne biota to microwave transmission from satellite power system
[DE83-006495] N83-27498
A review of the current state of European research and knowledge concerning the biological effects of radiowaves and microwaves
[AD-A125205] N83-27582
Persistent 1.5s oscillations superimposed at a solar burst observed at two mm-wavelengths
[INPE-2737-PRE/317] N83-27948
MIGRATION
The brine zone in the McMurdo Ice Shelf, Antarctica
[AD-A124516] N83-27558
MILITARY OPERATIONS
A summary of mission and system performance requirements for large space antennas N83-26865
Renewable energy technology handbook for military engineers
[DE82-017689] N83-27431
Estimating aircrew fatigue: A technique with application to airlift operations
[AD-A125319] N83-27594
MILITARY SPACECRAFT
Optimizing the space transportation system
[AD-A124920] N83-26913
MILKY WAY GALAXY
An electron-positron jet model for the galactic center N83-27929
The origin of the galactic annihilation radiation N83-27936
MILLING (MACHINING)
Method for milling and drilling glass
[NASA-CASE-GSC-12636-1] N83-27058
MINERAL DEPOSITS
Geology and mineral resources of the Baltimore 1 deg by 2 deg NTMS quadrangle, Maryland-Pennsylvania-Virginia N83-27328
Geology and mineral resources of the Boston 1 deg by 2 deg NTMS quadrangle, Massachusetts-New Hampshire N83-27329
Geology and mineral resources of the Lake Champlain 1 deg by 2 deg NTMS quadrangle, New Hampshire-New York-Vermont N83-27330
Geology and mineral resources of the Providence 1 deg by 2 deg NTMS quadrangle, Connecticut-Massachusetts-Rhode Island N83-27331
MINERAL EXPLORATION
Study of LANDSAT-D thematic mapper performance as applied to hydrocarbon exploration --- Southern Ontario, Lawton, Oklahoma; Owl Creek, Wyoming; Washington, D.C.; and Death Valley California
[E83-10325] N83-27310

Geology and mineral resources of the Baltimore, Boston, Lake Champlain, and Providence 1 deg by 2 deg NTMS quadrangles. National Uranium Resource Evaluation Program
[DE83-009825] N83-27327
National Uranium Resource Evaluation Program: Supplement to hydrogeochemical and stream sediment reconnaissance basic data reports K/UR-405 and K/UR-408 through K/UR-443 GJBX-88(82)]
[DE82-013774] N83-27336

MINIATURE ELECTRONIC EQUIPMENT
Manufacturing Methods and Technology (MM&T) specifications for miniature cathode ray tube
[AD-A124954] N83-27131

MINICOMPUTERS
Potential of minicomputer/array-processor system for nonlinear finite-element analysis
[NASA-TM-84566] N83-27259
Small computers in the federal government: Management is needed to realize potential and prevent problems
[GAO/AFMD-83-36] N83-27604

MINIMAX TECHNIQUE
Large amplitude time periodic solutions of a semilinear wave equation
[AD-A125257] N83-27654
Optimal decentralized control of finite nondeterministic systems
[AD-A124940] N83-27684

MINING
Methane recovery from horizontal holes in advance of mining
[DE82-017673] N83-27337

MINNESOTA
Composition and assembly of a spectral and agronomic data base for 1980 spring small grain segments
[E83-10311] N83-27301

MIRROR FUSION
Future Engineering Needs of Magnetic Fusion
[PB83-149757] N83-27874

MIRRORS
Focussing considerations in the race track microtron and double-sided microtron N83-27774

MIS (SEMICONDUCTORS)
Silicon MIS/inversion-layer solar cells
[DE83-005422] N83-27453

MISALIGNMENT
Statistical treatment of misalignments in linear accelerators N83-27757

MISSILE TRAJECTORIES
Post-flight trajectory reconstruction of a maneuvering reentry vehicle from radar measurements
[AD-A124805] N83-26852

MISSILES
Constant parameter two component channel flows N83-26797

MISSION PLANNING
A summary of mission and system performance requirements for large space antennas N83-26865

MIXING
Mixing of compressible fluid with application to ejector thrusters N83-26803
Advances in ejector technology: A tribute to Hans von Ohain's vision N83-26805
Pulverized fuel and scaleup methodologies
[DE82-014822] N83-26962
An analysis of the Wyngaard-LeMone model of refractive index and micrometeorological structure functions at the top of a turbulent mixed layer
[AD-A123986] N83-27548

MIXING LENGTH FLOW THEORY
Turbulence models; a lecture course
[CFD/82/4-REV] N83-27180

MIXTURES
Corner-turning characteristics of TATB/HMX/Kel-F mixtures
[DE83-006931] N83-27037

MODULATION
Performance optimization of PCM/SCO telemetry systems
[DE82-015797] N83-26917

MODULATORS
Modulator reliability and bandwidth improvement: Replacing tetrodes with MOSFETs N83-27783

MODULUS OF ELASTICITY
Polymers in mechanical systems: Structure-property requirements
[DE83-005590] N83-27029
Interfacing a torsion pendulum with a microcomputer
[DE83-004032] N83-27792

MOISTURE
Compression and compression fatigue testing of composite laminates
[NASA-CR-168023] N83-26928
Field experiences underscore the importance of moisture control in energy-efficient homes
[DE83-901234] N83-27064

MOISTURE CONTENT
Pneumatic conveying of coal and coal-limestone mixtures as applied to atmospheric fluidized-bed combustion
[DE82-015694] N83-27243

MOLDING MATERIALS
Interaction of ceramics with molten materials during directed crystallization
[PNR-90155] N83-27030

MOLECULAR BEAMS
Molecular beam studies of primary photochemical processes
[DE83-006190] N83-26946

MOLECULAR CLOUDS
Constant parameter two component channel flows N83-26797

MOLECULAR EXCITATION
Investigation of the dynamics of electronically excited states after excitation with an excimer laser
[MPIS-14/1982] N83-27209
Investigation of the potential functions of weakly bound diatomic molecules and laser-assisted excitive Penning ionization
[DE82-017259] N83-27833

MOLECULAR ORBITALS
Molecular-orbital calculations for polynitropolyhedranes
[DE82-018390] N83-27023

MOLECULAR STRUCTURE
Molecular dynamics of chemical reactions in solution
[AD-A124953] N83-26941
Synthetic-fuel combustion: Pollutant formation. Scot-initiation mechanisms in burning aromatics
[DE83-005611] N83-26945
Molecular ingredients of heterogeneous catalysis
[DE82-018584] N83-26950
Properties of three-dimensional energetic solids and molecular crystals
[AD-A124944] N83-27880

MOLYBDENUM
Beam broadening in a strongly scattering target in the analytical electron micropscope
[DE82-014085] N83-27825

MOLYBDENUM ALLOYS
Space reactors
[DE82-019187] N83-27837

MOMENTS
Moment-rotation characteristics of semi-rigid steel beam-column connections
[PB83-145318] N83-27081

MOMENTUM
Highlights of an ejector analysis N83-26804
End wall flow characteristics and overall performance of an axial flow compressor stage
[NASA-CR-3671] N83-26819

MONITORS
Simulated monitor display for CCTV
[DE82-017020] N83-27552
Loss monitors for the Fermilab linac N83-27737

MONKEYS
A finite element analysis of the creep response of lumbar intervertebral joints in the Rhesus monkey
[AD-A124740] N83-27570

MONOTONE FUNCTIONS
Some remarks on the continuation method of Leray-Schauder-Rabinowitz and the method of monotone iterations
[AD-A125267] N83-27645

MONTANA
Composition and assembly of a spectral and agronomic data base for 1980 spring small grain segments
[E83-10311] N83-27301

MONTE CARLO METHOD
An efficient algorithm for generating random number pairs drawn from a bivariate normal distribution
[NASA-TP-2173] N83-27679
Beam broadening in a strongly scattering target in the analytical electron micropscope
[DE82-014085] N83-27825

MOORING
Blake Plateau: Mid-depth and bottom current measurements
[PB83-144519] N83-27567
Interpretation of the physical oceanography of Georges Bank, volume 1
[PB83-149054] N83-27568

MORPHOLOGY
Morphological effects of chronic action of SHF field on nervous system of mice N83-27574

MOTIVATION
Survival; motivation; preparation
[FOA-C-54045-H1] N83-27598

MOUNTAINS
New pollutant dispersion model for application in mountain valleys
[DE83-005289] N83-27509
Numerical simulation of the influence of small scale mountain ranges on a baroclinic wave
[AD-A125301] N83-27546

MTBF
MTBF confidence bounds based on MIL-STD-781C fixed-length test results N83-26813

MULTIBEAM ANTENNAS
Large spaceborne antenna technology: A system perspective N83-26854
Land mobile satellite system requirements N83-26855
Audio direct broadcast satellites N83-26857
Pushbroom radiometry and its potential using large space antennas N83-26860

MULTIMISSION MODULAR SPACECRAFT
LANDSAT-D flight segment operations manual, volume 1
[E83-10285] N83-27287
LANDSAT-D flight segment operations manual, volume 2
[E83-10286] N83-27288

MULTIMODE RESONATORS
Aluminum nitride thin film and composite bulk wave resonators
[DE82-019303] N83-27135

MULTIPATH TRANSMISSION
Simulation of multipath propagation on digital radiolinks
[FOA-A-30032-E2] N83-27111

MULTIPLE BEAM INTERVAL SCANNERS
Phased array-fed antenna configuration study
[NASA-CR-168077] N83-27086

MULTIPOLES
Design of REC permanent magnet quadrupoles taking into account B, H non-linearity N83-27770

MULTIPROCESSING (COMPUTERS)
A modular system for the control of complex accelerators using portable software N83-27781
Development of a query processor for a back-end multiprocessor relational database computer
[AD-A124885] N83-27907

MULTISPECTRAL BAND SCANNERS
LANDSAT-4 to ground station interface description
[E83-10292] N83-27291
LANDSAT 4 investigations of thematic mapper and multispectral scanner applications
[E83-10301] N83-27292
Geometric accuracy of LANDSAT-4 MSS image data
[E83-10347] N83-27322

MULTISPECTRAL PHOTOGRAPHY
Parallel processing implementations of a contextual classifier for multispectral remote sensing data
[E83-10273] N83-27285

MULTIVARIATE STATISTICAL ANALYSIS
A study of multivariate statistical analysis techniques for computer performance evaluation
[AD-A124899] N83-27681

MUON SPIN ROTATION
Muon spin-rotation study on magnetite
[DE82-019535] N83-27834

MUSCULAR STRENGTH
Angular specificity and test mode specificity of isometric and isokinetic strength training
[AD-A124976] N83-27585

MYOCARDIAL INFARCTION
Effect of decimeter waves on functional state of cardiovascular system, some biochemical and immunological parameters of patients recovering from myocardial infarction N83-27573

N

NACELLES
Effects of varying podded nacelle-nozzle installations on transonic aeropropulsive characteristics of a supersonic fighter aircraft
[NASA-TP-2120] N83-26821
Effects of varying podded Nacelle-nozzle installations on transonic aeropropulsive characteristics of a supersonic fighter aircraft
[NASA-TP-120] N83-26823

NASA PROGRAMS
NASA STI-RECON Bulletin and Tech Info News
[NASA-CR-172685] N83-27904
NASA authorization for fiscal year 1984
[GPO-19-200] N83-27921

NATURAL GAS
Deep-source-gas workshop technical proceedings
[DE83-005003] N83-27339

Phase 2 Brayton/Rankine 10-ton gas-fired space-conditioning system
[DE82-016367] N83-27355
Technical support for geopressured-geothermal-well activities in Louisiana
[DE83-005297] N83-27473

NATURAL GAS EXPLORATION
Study of LANDSAT-D thematic mapper performance as applied to hydrocarbon exploration — Southern Ontario, Lawton, Oklahoma; Owl Creek, Wyoming; Washington, D.C.; and Death Valley California
[E83-10325] N83-27310

NAVIER-STOKES EQUATION
The energy balance in axisymmetric steady compressible swirl flows with closed streamlines N83-26789
Implicit upwind methods for the compressible Navier-Stokes equations
[NASA-TM-84364] N83-27149
Finite element approximation of the nonstationary Navier-Stokes problem. Part 2: Stability of solutions and error estimates uniform in time
[PREPRINT-558-PT-2] N83-27179

NEAR FIELDS
A survey of near-field testing methods for large aperture antennas and future trends N83-26896
Near-field measurement facility plans at Lewis Research Center N83-26897

NEAR ULTRAVIOLET RADIATION
The extinction of starlight at wavelengths near 2200A — by inorganic particles N83-27941

NEON
Effective charge of low-velocity nitrogen, neon and argon ions in carbon, aluminum and gold N83-27716

NETWORK CONTROL
Concepts for connectivity and interoperability of world space data networks: INPE proposal to CCSDS/Panel 3
[INPE-2722-PRE/307] N83-27066

NETWORK SYNTHESIS
DPSNA-1: A simulation model for queueing networks with limited capacity and repetition of service demand calls — packet switching networks
[FUB-19-1982] N83-27118
Automatic generation of adequate graphs with given connectivity conditions
[FUB-20-1982] N83-27119
Test networks defined by an average rank and a planarity index — telecommunication networks, graph theory
[FUB-31-1982] N83-27124

NEUTRINOS
Proceedings of the Los Alamos Neutrino Workshop
[DE83-000427] N83-27812
The Gamow-Teller strength functions and neutrino problems
[DE82-018357] N83-27828

NEUTRON DIFFRACTION
Experimental characterization of the flux-line lattice in superconducting V3Si
[DE83-004647] N83-27888

NEUTRON IRRADIATION
Use of microhardness to determine the strengthening and microstructural alterations of 14-MeV-neutron-irradiated metals
[DE82-014002] N83-27000

NEUTRON SCATTERING
Fast-neutron total and scattering cross sections of elemental palladium
[DE82-019475] N83-27001
Fast-neutron scattering cross sections of elemental silver
[DE82-019477] N83-27883

NEUTRON SOURCES
The linear accelerator for the proposed German spallation source N83-27728
Dead beat filling and feedforward RF control for the spallation neutron source SNQ N83-27733
Preaccelerator design and component development for the SNQ linear accelerator N83-27734

NEUTRON STARS
NASA/Goddard Space Flight Center contributions to the Workshop on Positron-Electron Pairs in Astrophysics
[NASA-TM-85027] N83-27928
Comparison of photon-photon and photon-magnetic field pair production rates N83-27930
Pair production and annihilation in strong magnetic fields N83-27931

NEUTRONS
Comparison of neutron and heavy-ion damage in a stable austenite
[DE82-017369] N83-27009
Note on the elastic-scattering of few-MeV neutrons from elemental calcium
[DE82-019476] N83-27827

NEVADA
Wildland inventory and resource modeling for Douglas and Carson City Counties, Nevada, using LANDSAT and digital terrain data
[E83-10302] N83-27293

NEW HAMPSHIRE
Geology and mineral resources of the Boston 1 deg by 2 deg NTMS quadrangle, Massachusetts-New Hampshire N83-27329
Geology and mineral resources of the Lake Champlain 1 deg by 2 deg NTMS quadrangle, New Hampshire-New York-Vermont N83-27330

NEW MEXICO
Small hydroelectric power plant for Aztec, New Mexico
[DE82-903957] N83-27432

NEW YORK
Geology and mineral resources of the Lake Champlain 1 deg by 2 deg NTMS quadrangle, New Hampshire-New York-Vermont N83-27330

NICKEL
H2S removal from coal gas at mid temperature (150 to 200 deg C)
[DE82-011004] N83-26963

NICKEL ALLOYS
Aging response of a welded iron-based superalloy
[DE83-005856] N83-27005

NIOBIUM
Hydrogen transport in and through niobium
[DE82-017214] N83-26980
Low-temperature ultrasonic attenuation in rapidly cooled niobium containing oxygen and hydrogen
[DE82-012717] N83-27806
Beam broadening in a strongly scattering target in the analytical electron microscope
[DE82-014085] N83-27825
Fluxoid pinning by grain boundaries in bicrystals and polycrystals of niobium
[DE82-017406] N83-27891

NIOBIUM ALLOYS
Toughness of submerged arc weld metals of controlled rolled Nb bearing steel N83-27232

NITRO COMPOUNDS
Molecular-orbital calculations for polynitropolyhedranes
[DE82-018390] N83-27023

NITROGEN
Heat-transfer distributions on biconics at incidence in hypersonic-hypervelocity He, N2, air, and CO2 flows
[NASA-TM-84667] N83-27150
Laboratory tests at elevated pressures of a silane igniter system for in-situ coal gasification
[DE83-007217] N83-27450

NITROGEN IONS
Anomalies in the thickness dependence of the energy loss of helium and nitrogen ions in very thin carbon foils N83-27710
Effective charge of low-velocity nitrogen, neon and argon ions in carbon, aluminum and gold N83-27716

NITROGEN OXIDES
Fluidised-bed combustion. Initial results obtained in a 1-ft by 1-ft fluidised-bed combustor operating at pressures up to 20 ATM
[DE83-005956] N83-26974
High-Temperature-Turbine-Technology Program. Phase 2: Technology test and support studies. Design and development of a high temperature low emissions combustor for stationary gas turbines
[DE83-005895] N83-27246

NODES (STANDING WAVES)
Mapping method for generating three-dimensional meshes: Past and present
[DE82-014077] N83-27664

NOISE POLLUTION
AICUZ (Air Installation Compatible Use Zone) report
[AD-A124974] N83-27801

NOISE PREDICTION (AIRCRAFT)
JT150 1/2-scale nozzle jet noise experiment and comparison with prediction
[NASA-TM-83370] N83-27793

NOISE SPECTRA
A note on the oscillation of cavities coupled to aerodynamic flows N83-26795
The phase noise of semiconductor lasers in single mode optical fiber heterodyne systems
[ENST-E-82013] N83-27211

NONDESTRUCTIVE TESTS
Detectability of defects by thermal non-destructive testing
[AERE-R-10802] N83-27250

NONLINEAR PROGRAMMING
Local structure of feasible sets in nonlinear programming. Part 1: Regularity
[AD-A125244] N83-27657

NONLINEAR SYSTEMS
Reliability aspects of structural control
[PB83-145482] N83-27082
Stability of an impact-loaded elastic column with two degrees of freedom
[TULEA-1981-05-T] N83-27270
Influence of damping on the transverse displacement of an impact-loaded column with two degrees of freedom
[TULEA-1981-06-T] N83-27271
A categorized theory of bilinear systems over a ring
[CSIR-TWISK-264] N83-27636
Research on nonlinear dynamical systems
[AD-A125235] N83-27696

NONLINEARITY
Design of REC permanent magnet quadrupoles taking into account B, H non-linearity N83-27770

NONPARAMETRIC STATISTICS
A nonparametric clustering technique which estimates the number of clusters
[E83-10310] N83-27300

NORMAL DENSITY FUNCTIONS
Probabilistic design using numerical optimization
[AD-A125232] N83-27651
A simple approximation for bivariate normal probabilities
[AD-A125033] N83-27687

NORMALITY
An asymptotically orthonormal polynomial family
[AD-A125268] N83-27644

NORTH AMERICA
Geology and mineral resources of the Baltimore, Boston, Lake Champlain, and Providence 1 deg by 2 deg NTMS quadrangles. National Uranium Resource Evaluation Program
[DE83-009825] N83-27327

NORTH DAKOTA
Development of techniques for producing static strata maps and development of photointerpretive methods based on multitemporal LANDSAT data
[E83-10081] N83-27284
Composition and assembly of a spectral and agronomic data base for 1980 spring small grain segments
[E83-10311] N83-27301

NORTH SEA
Report on the West Sole Wind Structure Project 1982 — wind profiles at a North Sea offshore platform
[NMI-R-145] N83-27535

NOSE TIPS
Boundary-layer transition on blunt, slender cones at hypersonic Mach numbers N83-26794
Constant parameter two component channel flows N83-26797

NOTCH SENSITIVITY
Fatigue crack growth from blunt notches
[GKSS-82/E/44] N83-27276

NOTCH TESTS
Slow crack growth in spinel in water
[NASA-TM-85644] N83-27017

NOZZLE DESIGN
Effects of varying podded nacelle-nozzle installations on transonic aeropropulsive characteristics of a supersonic fighter aircraft
[NASA-TP-2120] N83-26821

NOZZLE FLOW
A collection of papers in the aerospace sciences
[AD-A122667] N83-26787
Compound-compressible nozzle flow N83-26790

NOZZLE GEOMETRY
Effects of varying podded Nacelle-nozzle installations on transonic aeropropulsive characteristics of a supersonic fighter aircraft
[NASA-TP-120] N83-26823

NOZZLES
Fluidelastic instability in shell and tube heat exchangers: A framework for a prediction method
[DE83-007812] N83-27264

NUCLEAR CAPTURE
Applications of resonance-averaged gamma-ray spectroscopy with tailored beams
[DE82-018098] N83-26955

NUCLEAR CHEMISTRY
LAMPF: Proposal status and summaries
[DE82-015887] N83-27841

NUCLEAR EXPLOSIONS
The National Seismic Station
[DE82-018224] N83-27527

NUCLEAR FISSION
Fast-neutron scattering cross sections of elemental silver
[DE82-019477] N83-27883

NUCLEAR FUELS
The plasma powerplant N83-26927

NUCLEAR FUSION
Dynamic powder compaction of rapidly solidified Path A alloy with increased carbon and titanium content
[DE82-017252] N83-27008
Tuning experience with the FMIT scale-model drift-tube linac N83-27741
High-power-density approaches to magnetic fusion energy: Problems and promise of compact Reversed-Field Pinch Reactors (CRFPR)
[DE82-015736] N83-27861
Future Engineering Needs of Magnetic Fusion
[PB83-149757] N83-27874

NUCLEAR INTERACTIONS
Folding models for elastic and inelastic scattering
[DE82-017426] N83-27819

NUCLEAR MAGNETIC RESONANCE
Effects of magnetic impurities on the apparent diffusion coefficient of hydrogen in metal hydrides deduced from NMR
[DE82-019124] N83-26979
Research in energetic compounds
[AD-A124911] N83-27024
Nuclear magnetic resonance gyroscope
[AD-A124925] N83-27185
An NMR study of hydrogen diffusion in metal hydrides containing parametric impurities
[DE83-004859] N83-27890

NUCLEAR PHYSICS
Proceedings of the Los Alamos Neutrino Workshop
[DE83-000427] N83-27812

NUCLEAR POWER PLANTS
Effects of hydrazine and pH on the corrosion of copper-alloy materials in AVT environments with oxygen
[DE83-901124] N83-27004

NUCLEAR POWER REACTORS
Nuclear reactor system study for NASA/JPL
[NASA-CR-172631] N83-27836

NUCLEAR PUMPING
Laser-optical studies of the spontaneous-fission isomer /sup 240m/Am
[DE82-017433] N83-27817

NUCLEAR RADIATION SPECTROSCOPY
The Gamow-Teller strength functions and neutrino problems
[DE82-018357] N83-27828

NUCLEAR REACTOR CONTROL
Verification studies of entrained-flow gasification and combustion systems with the SIMMER-II code
[DE82-012148] N83-26978

NUCLEAR REACTORS
Welding technologies and materials for energy applications in Japan N83-27218

NUCLEAR ROCKET ENGINES
First flight test of Chinese electron rocket is successful N83-26926

NUCLEAR SPIN
Laser measurements and nuclear structure
[DE82-017528] N83-27816

NUCLEAR STRUCTURE
Applications of resonance-averaged gamma-ray spectroscopy with tailored beams
[DE82-018098] N83-26955
Laser measurements and nuclear structure
[DE82-017528] N83-27816
Laser-optical studies of the spontaneous-fission isomer /sup 240m/Am
[DE82-017433] N83-27817

NUCLEAR WEAPONS
Energy and technology review
[DE82-019880] N83-27390

NUCLEI (NUCLEAR PHYSICS)
Laser-optical studies of the spontaneous-fission isomer /sup 240m/Am
[DE82-017433] N83-27817

NUMERICAL ANALYSIS
Application of the vortex-lattice method to propeller performance analysis
[AD-A124837] N83-26840
Analysis of flame propagation
[DE82-018582] N83-26948
Evaluation of physical and numerical hydraulic models, Masonboro Inlet, North Carolina
[AD-A116110] N83-27557
Probabilistic design using numerical optimization
[AD-A125232] N83-27651
Local structure of feasible sets in nonlinear programming. Part 1: Regularity
[AD-A125244] N83-27657
The stability of one-step schemes for first-order two-point boundary value problems
[AD-A125240] N83-27659
Numerical simulations for intense light-ion beam propagation in channel under influence of plasma inertia
[IPPJ-627] N83-27854

NUMERICAL CONTROL
The servicing of complex NC manufacturing systems --- numerical control (NC)
[PNR-90153] N83-27069
Automatable tool system for turning operations
[PNR-90166] N83-27077
Longitudinal beam optimization of the Argonne superconducting heavy-ion liner accelerator N83-27780
The distributed control system for the Fermilab 200 MeV Linac N83-27782

O

OAK RIDGE ISOCHRONOUS CYCLOTRON
Database automation of accelerator operation
[DE82-017525] N83-27915

OATS
Australia ground data collection 1981-82 crop year, appendixes A and B, volume 2
[E83-10316] N83-27305
Australia ground data collection 1981-82 crop year, volume 1
[E83-10317] N83-27306

OCEAN BOTTOM
Laboratory simulation of a deep-ocean in-situ heat-transfer experiment
[DE82-018656] N83-27171
Bathymetric data and analysis for the NRL remote sensing experiment: Phelps Bank, July 1982
[AD-A125220] N83-27563
Blake Plateau: Mid-depth and bottom current measurements
[PB83-144519] N83-27567

OCEAN CURRENTS
Long term upper ocean study (LOTUS): A summary of the historical data and engineering test data
[AD-A124362] N83-27559
Blake Plateau: Mid-depth and bottom current measurements
[PB83-144519] N83-27567
Interpretation of the physical oceanography of Georges Bank, volume 1
[PB83-149054] N83-27568

OCEAN DATA ACQUISITIONS SYSTEMS
Long term upper ocean study (LOTUS): A summary of the historical data and engineering test data
[AD-A124362] N83-27559
A compilation of moored instrument data and associated oceanographic observations. Volume 30: Gulf Stream extension and Norwegian Sea overlow intrusion experiments, 1979 - 1980
[AD-A124818] N83-27562

OCEAN MODELS
Mean wave drift forces: Theory and experiment --- water waves
[NMI-R-124] N83-27146

OCEAN SURFACE
Long term upper ocean study (LOTUS): A summary of the historical data and engineering test data
[AD-A124362] N83-27559

OCEANOGRAPHIC PARAMETERS
Satellite applications to acoustic prediction systems
[AD-A125027] N83-27564

OCEANOGRAPHY
Interpretation of the physical oceanography of Georges Bank, volume 1
[PB83-149054] N83-27568

OCEANS
Tidal and lunar data for Point Mugu, San Nicolas Island, and the Barking Sands area during 1983
[AD-A124810] N83-27565

OFFGASSING
Incinerator development program for processing transuranic waste at the Idaho National Engineering Laboratory
[DE82-017265] N83-27839

OFFSHORE ENERGY SOURCES
Technical support for geopressured-geothermal-well activities in Louisiana
[DE83-005297] N83-27473

OFFSHORE PLATFORMS
Wave forces on circular cylinders with large excrescences at low Keulegan and Carpenter numbers --- water waves
[NMI-R-133] N83-27254
A comparison of two methods for calculating wave drift forces --- water waves, offshore structures
[NMI-R-137] N83-27255
Report on the West Sole Wind Structure Project 1982 --- wind profiles at a North Sea offshore platform
[NMI-R-145] N83-27535

OIL EXPLORATION
Study of LANDSAT-D thematic mapper performance as applied to hydrocarbon exploration --- Southern Ontario, Lawton, Oklahoma; Owl Creek, Wyoming; Washington, D.C.; and Death Valley California
[E83-10325] N83-27310

OIL FIELDS
Libya, Algeria and Egypt: Crude oil potential from known deposits
[DE82-018578] N83-27334

OIL RECOVERY
Commercial scale demonstration: Enhanced oil recovery by micellar-polymer flood
[DE82-013574] N83-27333

OILS
Proceedings of the Fourth International Symposium on Coal-Slurry Combustion, volume 4
[DE82-016336] N83-26983

OLIVINE
Domestic olivine versus magnesite as a thermal energy storage material: Performance comparisons for electrically heated room-size units in accordance with ASHRAE standard 94.2
[DE82-017389] N83-27466

ON-LINE SYSTEMS
A backend data base system for the Eglin computer network
[AD-A124908] N83-27911

ONBOARD DATA PROCESSING
LANDSAT-4 to ground station interface description
[E83-10292] N83-27291

ONE DIMENSIONAL FLOW
Constant parameter two component channel flows N83-26797
Highlights of an ejector analysis N83-26804
Shock-wave response of titanium sunhydride-potassium perchlorate
[DE82-016739] N83-27043

OPERATING TEMPERATURE
Method of studying the operating temperature of gas turbines --- aeroengines
[PNR-90159] N83-26842

OPERATORS (MATHEMATICS)
Some remarks on the continuation method of Leray-Schauder-Rabinowitz and the method of monotone iterations
[AD-A125267] N83-27645
Eigenvalue problem for Hermitian matrices with time-reversal symmetry
[DE83-005629] N83-27895

OPTICAL EQUIPMENT
Durable innovative solar optical materials: The international challenge N83-27358
A variable strength permanent magnet dipole N83-27745

OPTICAL HETERODYNING
The phase noise of semiconductor lasers in single mode optical fiber heterodyne systems
[ENST-E-82013] N83-27211

OPTICAL MEASURING INSTRUMENTS
Development of a simplified optical technique for the simultaneous measurement of particle size distribution and velocity
[NASA-TP-2185] N83-27846

OPTICAL MICROSCOPES
Evaporated lithium-doped amorphous silicon solar cells
[DE82-018078] N83-27400

OPTICAL POLARIZATION
Nuclear magnetic resonance gyroscope
[AD-A124925] N83-27185

OPTICAL PROPERTIES
Diesel fuel oils, 1982
[DE83-006115] N83-27051
Transparent Heat Reflecting Coatings (THRC) based on highly doped tin oxide and indium oxide N83-27362
Concentrated solar-flux measurements at the IEA-SSPS solar-central-receiver power plant, Tabernas - Lameria (Spain)
[DE82-020000] N83-27528
The design of double sided microtrons N83-27778

OPTICAL PUMPING
Laser-optical studies of the spontaneous-fission isomer /sup 240m/Am
[DE82-017433] N83-27817

OPTICAL SCANNERS
Automatic threshold design for a bound document scanner
[AD-A125316] N83-27913

OPTICAL TRACKING
Enhanced tracking of airborne targets using a correlator-Kalman filter
[AD-A124884] N83-27097

OPTIMAL CONTROL
Investigation of a third order baro-damped verticle channel of INS
[AD-A124882] N83-26828
Probabilistic design using numerical optimization
[AD-A125232] N83-27651
Optimal decentralized control of finite nondeterministic systems
[AD-A124940] N83-27684
OPTIMIZATION
Performance optimization of PCM/SCO telemetry systems
[DE82-015797] N83-26917
Flame optimization for the spectroscopic analysis of the chemiluminescence from lead oxide
[AD-A124825] N83-26937
Optimized two-capacity advanced electric heat pump
[DE82-017447] N83-27173
Optimization of three dimensional combined truss/frame structures
[AD-A124988] N83-27263
FORTRAN based linear programming for microcomputers
[AD-A124804] N83-27605
Matching based interactive facility layout
[AD-A124958] N83-27609
Recent developments in algorithms and software for trust-region methods
[DE83-006276] N83-27667
Optimal smoothing and estimation for hybrid state processes
[AD-A124907] N83-27683
Query optimization in distributed databases
[AD-A124921] N83-27909
ORBIT TRANSFER VEHICLES
Optimizing the space transportation system
[AD-A124920] N83-26913
Aerodynamic characteristics of generalized bent biconic bodies for aero-assisted, orbital-transfer vehicles
[NASA-TM-84362] N83-26918
Advanced propulsion concepts for orbital transfer vehicles
[NASA-TM-83419] N83-26924
ORGANIC COMPOUNDS
Organic solvent regeneration of granular activated carbon
[PB83-150201] N83-27078
Efficiency of buffered aqueous carboxylic acid solutions and organic solvents to absorb SO2 from industrial flue; solubility data from gas-liquid chromatography
[DE83-005405] N83-27510
ORGANIC SILICON COMPOUNDS
Silanization: Chemical surface modification of solid surfaces by silane coupling agents --- for detection systems
[FOA-C40166-C2(B2/A3)] N83-26984
ORIENTATION
Kahuku kite wind study. 1: Kahuku beach boundary layer
[DE83-006403] N83-27553
Kahuku kite wind study. 2: Kahuku foothills
[DE83-006402] N83-27554
ORTHOTROPIC PLATES
The stress distribution round an infinite row of circular holes in an orthotropic plate
[PB83-147157] N83-27279
OSCILLATIONS
Calculation of boundary layers near the stagnation point of an oscillating airfoil
[NASA-TM-84305] N83-27148
Empirical stopping powers for ions in solids N83-27706
Persistent 1.5s oscillations superimposed at a solar burst observed at two mm-wavelengths
[INPE-2737-PRE/317] N83-27948
OSCILLATORS
Mean excitation energies for use in Bethe's stopping-power formula N83-27703
OUTPUT
The X-Y digital plotter as an output unit for the CDRA 1325 digital computers
[AD-A124799] N83-27608
OXIDATION
Molecular ingredients of heterogeneous catalysis
[DE82-018584] N83-26950
High-temperature corrosion of iron in sulfur-containing atmosphere
[DE83-006965] N83-27007
NASA interdisciplinary collaboration in tribology. A review of oxidational wear
[NASA-CR-3686] N83-27021
OXIDATION RESISTANCE
Processing of fused silicide coatings for carbon-based materials
[NASA-TM-83362] N83-27019
OXIDATION-REDUCTION REACTIONS
Identification and cleavage of breakable single bonds by selective oxidation, reduction, and hydrolysis
[DE82-016800] N83-26957
Catalytic CO2 gasification of graphite vs. coal char
[DE82-016412] N83-26959
Coal-gasification catalysis mechanisms
[DE82-013824] N83-26960
OXIDE FILMS
NASA interdisciplinary collaboration in tribology. A review of oxidational wear
[NASA-CR-3686] N83-27021
OXYGEN
Autoignition of kerosene/oxygen mixtures in a fluidized bed
[DE82-016376] N83-26952
Evaluation and performance of closed-circuit breathing apparatus
[DE82-015877] N83-27601
Measurement of the thermodynamic quantities for the AG-S system by the EMF method
[NRC/CNR-TT-2062] N83-27892
OZONE
High altitude jet fuel photochemistry
[AD-A125035] N83-27035
The DMSP/MFR total ozone and radiance data base
[NASA-CR-170370] N83-27531
Aircraft measurements of trace gases and particles near the tropopause
[NASA-CR-3691] N83-27542

P

PACIFIC OCEAN
SoutHern Hemisphere application of the Navy nested tropical cyclone model
[AD-A125011] N83-27545
PACKET SWITCHING
DPSNA-1: A simulation model for queueing networks with limited capacity and repetition of service demand calls --- packet switching networks
[FUB-19-1982] N83-27118
A flow control scheme considering retransmissions in packet switched datagram transport networks
[FUB-32-1982] N83-27125
PACKETS (COMMUNICATION)
Networking DEC and IBM computers
[NASA-TM-85019] N83-27633
PAIR PRODUCTION
NASA/Goddard Space Flight Center contributions to the Workshop on Positron-Electron Pairs in Astrophysics
[NASA-TM-85027] N83-27928
An electron-positron jet model for the galactic center N83-27929
Comparison of photon-photon and photon-magnetic field pair production rates N83-27930
Pair production and annihilation in strong magnetic fields N83-27931
Pair production near threshold in pulsar magnetic fields N83-27934
PALLADIUM
Fast-neutron total and scattering cross sections of elemental palladium
[DE82-019475] N83-27001
PANELS
The simulation of a passive solar energy system
[AD-A124900] N83-27354
PARABOLAS
Linear parabolic equations with a singular lower order coefficient
[AD-A125245] N83-27656
PARABOLIC DIFFERENTIAL EQUATIONS
The lumped mass finite element method for a parabolic problem
[CTH-MATH-1983-1] N83-27672
PARABOLIC REFLECTORS
Wrap-rib antenna concept development overview N83-26873
PARABOLOID MIRRORS
Transparent heat-mirror materials and deposition technology
[DE83-007042] N83-27357
Durable innovative solar optical materials: The international challenge N83-27358
Materials for transparent heat mirror coatings N83-27360
Optical properties of transparent heat mirrors based on thin films of TiN, ZrN, and HfN N83-27361
Heat mirrors on plastic sheet using transparent oxide conducting coatings N83-27364
Performance and sputtering criteria of modern architectural glass coatings N83-27366
PARALLEL PROCESSING (COMPUTERS)
Parallel processing implementations of a contextual classifier for multispectral remote sensing data
[E83-10273] N83-27285
PARAMETER IDENTIFICATION
Analysis of representative parameters grouping for the evaluation of voice signal automatic speaker recognition methods
[FUB-14-1982] N83-27115
A prony methody for noisy data: Choosing the signal components and selecting the order in exponential signal models
[AD-A124897] N83-27646
PARTIAL DIFFERENTIAL EQUATIONS
Boundary conditions for suppressing rapidly moving components in hyperbolic systems, 1
[AD-A120962] N83-27164
Boundary conditions for suppressing rapidly moving components in hyperbolic systems. 2: An example
[AD-A120963] N83-27165
On the numerical solution of some 2-D electromagnetic interface problems by the boundary collocation method
[AD-A125269] N83-27666
Research on nonlinear dynamical systems
[AD-A125235] N83-27696
PARTICLE ACCELERATION
The pulsed proton prototype of a high current ion linac N83-27747
Beam dynamics in heavy ion induction linacs N83-27750
Beam dynamics studies of high current RFQ and DTL tanks N83-27756
PARTICLE ACCELERATORS
Design and constraints for the ZEBRA injector, RFQ and DTL N83-27736
Brazing techniques and alloys for accelerator RF components N83-27742
Properties of a 0-mode RFQ structure and recent experimental results N83-27748
The 1981 Linear Accelerator Conference on Proton Beam Emittance Growth in Linac N83-27755
Recent work on collective accelerators N83-27771
Ion source development and injector design for Zebra N83-27776
Remarks on future accelerators and future physics
[DE83-006643] N83-27822
Plasma laser accelerator: Longitudinal dynamics, the plasma/laser interaction, and a qualitative design
[DE82-014986] N83-27870
PARTICLE BEAMS
Energy and technology review
[DE82-019880] N83-27390
Matching the RF quadrupole beam to the drift tube section in the FMIT accelerator N83-27732
Loss monitors for the Fermilab linac N83-27737
Variable energy standing wave linear accelerator structure N83-27765
LAMPF transition region
[DE82-019489] N83-27824
Current interruption and particle beam generation by a plasma focus
[AD-A125024] N83-27858
Transverse coherent instabilities and a dipole feedback damper for coexisting coasting and bunched beams
[DE82-016613] N83-27869
PARTICLE COLLISIONS
The incorporation of particle collisions in the time-dependent Hartree-Fock approximation
[DE82-017481] N83-27818
PARTICLE EMISSION
Emission of high-energy, light particles from intermediate-energy heavy-ion reactions
[DE82-017403] N83-27815
High-energy physics at Tufts University
[DE83-007503] N83-27840
PARTICLE ENERGY
A local single particle self energy for the Hubbard model
[INPE-2736-PRE/316] N83-27810
Database automation of accelerator operation
[DE82-017525] N83-27915
PARTICLE MOTION
MOTION: A versatile multiparticle simulation code N83-27758
PARTICLE PRECIPITATION
ARIS: Acid Rain Information System
[DE83-007026] N83-27512
Relationships between field-aligned currents, electric fields and particle precipitation as observed by dynamics Explorer-2
[NASA-TM-85025] N83-27519
PARTICLE SIZE DISTRIBUTION
An investigation of the effectiveness of smoke suppressant fuel additives for turbojet applications
[AD-A125025] N83-27034

Effects of particle characteristics on performance of RRSK PETN
[DE82-018553] N83-27044
Aircraft measurements of trace gases and particles near the tropopause
[NASA-CR-3691] N83-27542
Development of a simplified optical technique for the simultaneous measurement of particle size distribution and velocity
[NASA-TP-2185] N83-27846

PARTICLE SPIN
Hunt for the 1(1)P sub 1 bound state of charmonium
[DE82-009520] N83-27829

PARTICLE THEORY
Fractional charge search
[DE82-018607] N83-27194
A finite-particle-number approach to physics
[DE83-007014] N83-27791

PARTICLE TRAJECTORIES
DIF1: A dispersion program which can handle pollution and reflection
[ATMOS/82/11] N83-27478

PARTICLES
Mechanisms of electronic description
[DE82-018590] N83-27887

PARTICULATE SAMPLING
Deposition of aerosols in sampling tubes
[DE82-017311] N83-27062
Particle analyzing method and apparatus
[NASA-CASE-NPO-15292-1] N83-27184
Literature review of sampling probes. Phase 5: Probe inlet design
[DE82-017327] N83-27505

PASTES
Electrochemical studies at carbon black paste electrodes containing cupric chloride additive
[AD-A125276] N83-26942

PATTERN RECOGNITION
Design and simulation of a unique signal mechanism
[DE82-011568] N83-27110
Using pyramids to detect good continuation
[AD-A124848] N83-27616
Development of procedures and algorithms for pattern recognition and image processing based on two-dimensional Markov models
[AD-A124917] N83-27682

PATTERN REGISTRATION
Contour-based motion estimation
[AD-A124812] N83-27848

PEAT
Development of a biochemical process for production of alcohol fuel from peat
[DE82-016892] N83-27039
Hydropyrolysis of biomass and related materials for the production of liquids
[DE82-012928] N83-27402

PENDULUMS
Interfacing a torsion pendulum with a microcomputer
[DE83-004032] N83-27792

PENETRATION
Weld penetration variation in GTA welding of some 304 L stainless steels N83-27222

PENETROMETERS
Shock-hardened, high-frequency, PCM system with memory for Earth-penetrator-study applications
[DE82-017644] N83-27242

PENNING EFFECT
Investigation of the potential functions of weakly bound diatomic molecules and laser-assisted excitive Penning ionization
[DE82-017259] N83-27833

PENNSYLVANIA
Geology and mineral resources of the Baltimore 1 deg by 2 deg NTMS quadrangle, Maryland-Pennsylvania-Virginia N83-27328

PERCEPTION
Knowledge and skill differences in novices and experts
[AD-A124466] N83-27592
Validation of brain event-related potentials as indicators of cognitive styles, abilities, and aptitudes
[AD-A125292] N83-27593
Implementation of planned change: A review of major issues
[AD-A125193] N83-27900

PERFORMANCE PREDICTION
A one-dimensional procedure for estimating the performance of ejector nozzles N83-26806
Dynamic characteristics of aerial refueling systems
[AD-A124770] N83-26830
Application of the vortex-lattice method to propeller performance analysis
[AD-A124837] N83-26840
Performance surfaces of adaptive predictors structures
[DE82-020090] N83-27663
A study of multivariate statistical analysis techniques for computer performance evaluation
[AD-A124899] N83-27681

PERFORMANCE TESTS
Testing of felt-ceramic materials for combustor applications
[NASA-CR-168103] N83-26837
A survey of near-field testing methods for large aperture antennas and future trends N83-26896
Near-field measurement facility plans at Lewis Research Center N83-26897
Experimental results of pitching moment tests on parabolic-trough solar-collector array configurations
[DE83-006027] N83-27446
S-C-R compatibility and dual task performance in two complex information processing tasks: Threat evaluation and fault diagnosis
[AD-A124340] N83-27589
Development of computer performance evaluation tools for VAX-11/780 computers
[AD-A124904] N83-27619
Analysis of ANSI N13.11: The performance algorithm
[DE82-019212] N83-27628

PERIPHERAL CIRCULATION
Investigation of adaptive processes in peripheral blood using mathematical modeling methods N83-27575

PERMEABILITY
Department of Energy's Western Gas Sands Project multi-well experiment update
[DE82-018291] N83-27529

PERMUTATIONS
Conditional permutation tests and the propensity score in observational studies
[AD-A125241] N83-27658

PEROXIDES
Role of amines in adhesion of polybutadiene to glass substrates. 1: Reactions of amines during peroxide curing of polybutadiene
[AD-A121685] N83-27027

PERSONNEL
Psychological and system variables in team problem solving: Experimental studies of computer-mediated participation
[AD-A124924] N83-27596
Operational readiness and the human factors environment
[DE83-005586] N83-27602

PERSONNEL MANAGEMENT
Implementation of planned change: A review of major issues
[AD-A125193] N83-27900

PERSPIRATION
Effects of sleep deprivation on thermoregulation during exercise
[AD-A124982] N83-27580

PERTURBATION
Degradation of a laser beam by a turbulent jet N83-26799
On Synge's criterion for the stability of plane Couette flow N83-26802
Some recent applications of XTRAN3S
[NASA-TM-85641] N83-26815
Dynamic response of ramjet inlets to downstream perturbations
[AD-A125295] N83-27157
Beam instabilities in race track microtrons N83-27773

PERTURBATION THEORY
Linearized stability of extreme shock profiles for systems of conservation laws with viscosity
[AD-A125256] N83-27159
Degenerate perturbation theory
[DE82-019555] N83-27665

PH FACTOR
Effects of hydrazine and pH on the corrosion of copper-alloy materials in AVT environments with oxygen
[DE83-901124] N83-27004

PHASE CHANGE MATERIALS
Phase-change materials in masonry construction
[DE83-007227] N83-27061

PHASE DIAGRAMS
Phase equilibria and transition in mixtures of a homopolymer and a block copolymer. 2: The phase diagram
[AD-A124929] N83-27025

PHASE MODULATION
Performance of sequentially decoded long constraint length codes for a satellite communications link in a scintillated channel
[AD-A124814] N83-27093
Simulation of multipath propagation on digital radiolinks
[FOA-A-30032-E2] N83-27111

PHASE SHIFT
The phase noise of semiconductor lasers in single mode optical fiber heterodyne systems
[ENST-E-82013] N83-27211
Phase variation in wave force data --- offshore structures
[NMI-R-132] N83-27253
Longitudinal beam optimization of the Argonne superconducting heavy-ion liner accelerator N83-27780

PHASE TRANSFORMATIONS
Ultrasonic mixing of epoxy curing agents
[NASA-TM-85643] N83-27018
Phase equilibria and transition in mixtures of a homopolymer and a block copolymer. 2: The phase diagram
[AD-A124929] N83-27025
Flash evaporation from turbulent water jets
[DE83-007311] N83-27166
Experiments with phase transitions at very high pressure --- compressed solidified gases, semiconductors, superconductors, and molecular crystals
[NASA-CR-3696] N83-27879

PHASED ARRAYS
Large Space Antenna Systems Technology, part 1
[NASA-CP-2269-PT-1] N83-26853
Auxiliary propulsion requirements for large space systems
[NASA-TM-83388] N83-26922
Phased array-fed antenna configuration study
[NASA-CR-168077] N83-27086
A new technique for reducing radar response to signals entering antenna sidelobes
[AD-A125191] N83-27101

PHENOMENOLOGY
Soot formation in synthetic-fuel droplets
[DE82-018420] N83-26958

PHENYLS
Chromatography of coal derived oil
[BLL-T5991/BG/MRA14684/82] N83-26935

PHONEMES
Speech intelligibility in closed large scale environments
[FUB-24-1982] N83-27123

PHONETICS
Towards very large vocabulary word recognition
[AD-A125224] N83-27094

PHOSPHORIC ACID FUEL CELLS
Develop and test fuel cell powered on-site integrated total energy systems. Phase 3: Full-scale power plant development
[NASA-CR-168021] N83-27345
Develop and test fuel cell powered on-site integrated total energy system
[NASA-CR-168021] N83-27348

PHOSPHORUS
Quantitative analysis of phosphosilicate glass films on silicaon wafers
[DE82-017642] N83-26953

PHOTOCHEMICAL REACTIONS
Molecular beam studies of primary photochemical processes
[DE83-006190] N83-26946
Role of amines in adhesion of polybutadiene to glass substrates. 4: The effect of amine structure and concentration on the strength of adhesion
[AD-A121686] N83-27026
High altitude jet fuel photochemistry
[AD-A125035] N83-27035

PHOTOCONDUCTIVITY
Dielectrics for radiation-hard capacitors: Polyvinylidene fluoride and polyethylene terephthalate
[DE82-019903] N83-27137

PHOTOELECTRIC EMISSION
A local single particle self energy for the Hubbard model
[INPE-2736-PRE/316] N83-27810

PHOTOELECTROCHEMICAL DEVICES
Development of photoelectrochemical cells based on compound semiconductors and nonaqueous electrolytes
[DE82-013700] N83-26968

PHOTOELECTRON SPECTROSCOPY
Technique and applications of X-ray photoelectron spectroscopy
[AERE-R-10803] N83-26988

PHOTOGEOLOGY
Study of LANDSAT-D thematic mapper performance as applied to hydrocarbon exploration --- Southern Ontario, Lawton, Oklahoma; Owl Creek, Wyoming; Washington, D.C.; and Death Valley California
[E83-10325] N83-27310
Geologic mapping of the Bauru Group in Sao Paulo state by LANDSAT images --- Brazil
[E83-10341] N83-27316

The Ponta Grossa Arch: A proposal for ts configuration and evolution from the interpretation of remote sensing data
[E83-10343] N83-27320
PHOTOGRAPHIC FILM
Mathematical modeling of black-and-white chromogenic image stability
[AD-A125248] N83-27186
PHOTOINTERPRETATION
Development of techniques for producing static strata maps and development of photointerpretive methods based on multitemporal LANDSAT data
[E83-10081] N83-27284
Effects of autocorrelation upon LANDSAT classification accuracy — Richmond, Virginia and Denver, Colorado
[E83-10328] N83-27312
Remote Sensing techniques used to characterize soil erosion in southwestern Sao Paulo state — Brazil
[E83-10339] N83-27315
Geologic mapping of the Bauru Group in Sao Paulo state by LANDSAT images — Brazil
[E83-10341] N83-27316
PHOTOLYSIS
Molecular beam studies of primary photochemical processes
[DE83-006190] N83-26946
PHOTON BEAMS
Instrumental photon activation analysis using the linear accelerator at the Naval Postgraduate School
[AD-A125003] N83-27811
PHOTON-ELECTRON INTERACTION
Photon-photon collisions
[DE83-007011] N83-27813
PHOTONS
Comparison of photon-photon and photon-magnetic field pair production rates N83-27930
PHOTOSYNTHESIS
Assessing solar energy and water use efficiencies in winter wheat
[E83-10329] N83-27313
Engineering analysis of potential photosynthetic bacterial hydrogen-production systems
[DE82-019151] N83-27414
Biosolar hydrogen and oxygen production
[DE82-017491] N83-27428
Photosynthetic water splitting
[DE82-017315] N83-27429
PHOTOVOLTAIC CELLS
Isolation transformers for utility-interactive photovoltaic systems
[DE83-006914] N83-27140
Data report for the Northeast Residential Experiment Station, March 1982
[DE82-018134] N83-27397
Data report for the Southwest Residential Experiment Station, February 1982
[DE82-016330] N83-27398
Intermediate photovoltaic system application experiment operational performance. Executive summary for Newman Power Station, El Paso, Texas
[DE82-019965] N83-27407
Intermediate photovoltaic system application experiment operational performance. Executive summary for Oklahoma Center for Science and Arts, Oklahoma City, Oklahoma
[DE82-019964] N83-27408
Intermediate photovoltaic system application experiment operational performance. Executive summary. Volume 6: Beverly High School, Beverly, Massachusetts
[DE82-015660] N83-27409
Intermediate photovoltaic system application experiment operational performance. Executive summary for Beverly High School, Beverly, Massachusetts
[DE82-019967] N83-27410
Intermediate photovoltaic system application experiment operational performance. Executive summary for CDC Light Manufacturing Building, San Bernardino, California
[DE82-019962] N83-27411
Intermediate photovoltaic system application experiment operational performance. Executive summary for Mississippi County Community College, Blytheville, Arkansas
[DE82-019966] N83-27412
Final materials, processes, and testing progress report for residential and non-residential applications
[DE82-017285] N83-27427
Collector trade-off study for BDM PRDA-35 application
[DE82-013532] N83-27434
Optimized low-cost-array field designs for photovoltaic systems
[DE82-013640] N83-27435
Intermediate photovoltaic system application experiment operational performance report, for April 1982. Volume 2: For Mississippi County Community College, Blytheville, Arkansas
[DE83-006448] N83-27439
Intermediate photovoltaic system application experiment operational performance report, for September 1982. Volume 5: For Oklahoma Center for Science and Arts
[DE83-006448] N83-27440
Intermediate photovoltaic system application experiment operational performance report, for October 1982. Volume 16: For Lovington Square Shopping Center, Lovington, New Mexico
[DE83-006447] N83-27441
Intermediate photovoltaic system application experiment operational performance report. Volume 16: For Newman Power Station, El Paso, Texas for October 1982
[DE83-006445] N83-27442
Intermediate photovoltaic system application experiment operational performance report for G. N. Wilcox Hospital, Kauai, Hawaii for September 1982, volume 5
[DE83-006843] N83-27454
Intermediate photovoltaic system application experimental operational performance report for Newman Power Station, El Paso, Texas for September 1982, volume 15
[DE83-006845] N83-27459
PHOTOVOLTAIC CONVERSION
Residential photovoltaic system simulation: Thermal aspects
[DE82-007784] N83-27399
PHOTOVOLTAIC EFFECT
Final materials, processes, and testing progress report for residential and non-residential applications
[DE82-017285] N83-27427
Design and development of a high-concentration photovoltaic concentration (2-d)
[DE82-008924] N83-27433
Natural Bridges National Monument photovoltaic power plant operations manual
[DE82-015388] N83-27438
PHYSIOLOGICAL EFFECTS
USSR report: Life sciences. Effects of nonionizing electromagnetic radiation, no. 9
[JPRS-83601] N83-27572
Effect of decimeter waves on functional state of cardiovascular system, some biochemical and immunological parameters of patients recovering from myocardial infarction N83-27573
Function of adreno-pituitary system in various regimes of effect of alternating magnetic field of industrial frequency N83-27576
PHYSIOLOGICAL RESPONSES
Response of the cardiovascular system to vibration and combined stresses
[AD-A125225] N83-27583
PILOT PERFORMANCE
Computer simulation of a multiaxis air-to-air tracking task using the optimal pilot control model
[AD-A125302] N83-27597
PILOT PLANTS
Analysis of a failed spent-char transfer line from the IGT HYGAS coal-gasification pilot plant
[DE82-014906] N83-26947
PILOTS (PERSONNEL)
Pilot human factors in stall/spin accidents of supersonic fighter aircraft
[NASA-TM-84348] N83-26846
PION BEAMS
LAMPF: Proposal status and summaries
[DE82-015887] N83-27841
PIPELINES
Analysis of a failed spent-char transfer line from the IGT HYGAS coal-gasification pilot plant
[DE82-014906] N83-26947
Development of improved plastic piping materials and systems for fuel gas distribution
[PB83-161109] N83-27079
PIPES (TUBES)
International Conference on Welding Technology for Energy Applications
[DE83-006404] N83-27215
High temperature properties of the seam weld portion in 1% Cr-0.5% Mo ERW boiler tubing after long-term aging N83-27223
Welding equipment and process development for inaccessible tube-to-tubesheet welding on a sodium-heated steam generator N83-27236
Project DEEP STEAM
[DE82-016394] N83-27389
PISTONS
Test results and description of a 1-kW free-piston Stirling engine with a dashpot load
[NASA-TM-83407] N83-27346
PITTING
Assessment of the quality of bearing steel from its inclusion content
[BLL-M-26906-(5828.4)] N83-26991
A statistical approach to the study of localized corrosion
[AERE-R-10832] N83-27014
PITUITARY GLAND
Function of adreno-pituitary system in various regimes of effect of alternating magnetic field of industrial frequency N83-27576
PLANE STRAIN
The stress distribution round an infinite row of circular holes in an orthotropic plate
[PB83-147157] N83-27279
PLANETARY ATMOSPHERES
Atmospheric boundary layer studies N83-27493
PLANETARY COMPOSITION
Smectites versus palagonites in Mars soil: Evidence from simulations of Viking biology labeled release experiments
[NASA-TM-84361] N83-27947
PLANETARY EVOLUTION
Conference on Planetary Volatiles
[NASA-CR-172682] N83-27938
PLANETARY WAVES
Synoptic precursors of three severe Brazilian freezes in the Pacific Ocean and South America
[INPE-2730-PRE/312] N83-27541
PLANT DESIGN
Matching based interactive facility layout
[AD-A124958] N83-27609
PLANT STRESS
Simulating soybean canopy temperature as affected by weather variables and soil water potential
[E83-10319] N83-27307
PLASMA ACCELERATORS
Plasma laser accelerator: Longitudinal dynamics, the plasma/laser interaction, and a qualitative design
[DE82-014986] N83-27870
PLASMA ARC WELDING
Improvement of fusion welding through modelling, measurement and real-time control N83-27226
PLASMA CONTROL
Ideal MHD stability calculations in axisymmetric toroidal coordinate systems
[DE82-009830] N83-27866
Experimental plasma research project summaries
[DE83-007066] N83-27871
PLASMA DENSITY
Simple method of sheet plasma production in lower pressure
[IPPJ-628] N83-27857
PLASMA DIAGNOSTICS
SAFE II: Large systems space plasma evaluation experiment N83-26903
Simultaneous multipoint measurements of density gradients and temperature in a flame
[DE83-007291] N83-26975
Research support for plasma diagnostic on Elmo Bumpy Torus. Observations of EBT ring geometry by means of diamagnetic field measurements using a compensated ferromagnetic resonance magnetometer, and a preliminary numerical study of EBT flux penetration dynamics
[DE83-007883] N83-27864
Experimental plasma research project summaries
[DE83-007066] N83-27871
PLASMA DYNAMICS
Plasma behaviors in the open field region of reversed-field theta-pinch
[IPPJ-624] N83-27856
PLASMA ENGINES
Aeronautical Knowledge (selected articles)
[AD-A123935] N83-26925
The plasma powerplant N83-26927
PLASMA EQUILIBRIUM
Use of the regularization method for designing the equilibrium system of a Tokamak reactor having a specified plasma geometry
[BLL-CTO-2117-(9091.9F)] N83-27851
PLASMA FOCUS
Current interruption and particle beam generation by a plasma focus
[AD-A125024] N83-27858
PLASMA HEATING
An investigation of the dynamics of the plasma corona
[DE82-019397] N83-27867
Experimental plasma research project summaries
[DE83-007066] N83-27871
Shear Alfven waves in Tokamaks
[DE83-007194] N83-27872
PLASMA INTERACTIONS
SAFE II: Large systems space plasma evaluation experiment N83-26903
PLASMA JETS
Explorator study of plasma arc jet shale conversion
[DE82-009090] N83-27388
An electron-positron jet model for the galactic center N83-27929
PLASMA PHYSICS
A collection of papers in the aerospace sciences
[AD-A122667] N83-26787

Retention and recycling of plasma-edge hydrogen isotopes in C and TiC
[DE82-019959] N83-27814
Recent results on the dense Z-pinch
[DE82-015802] N83-27859
Stability and confinement of spheromaks and field-reversed configurations
[DE82-018378] N83-27862
Experimental plasma research project summaries
[DE83-007066] N83-27871

PLASMA SPRAYING
Correlation of compressive stress with spalling of plasma sprayed ceramic materials
[NASA-TM-83406] N83-27016

PLASMAGUIDES
An analytical solution for the electrical properties of a Radio Frequency Quadrupole (RFQ) with simple vanes N83-27795

PLASMAS (PHYSICS)
Experimental studies on energy transport in a reversed field theta pinch
[IPPJ-626] N83-27853
Simple method of sheet plasma production in lower pressure
[IPPJ-628] N83-27857

PLASMONS
Inner-shell ionization and stopping power N83-27704
Energy losses to surface plasmons by charged particles N83-27713

PLASTIC DEFORMATION
The influence of some second order effects on the behaviour of rigid plastic shells at the yield point load
[ISSN-0208-5658] N83-27252
Fatigue crack growth from blunt notches
[GKSS-82/E/44] N83-27276
Use of analytical mechanics in defining acoustic-test methodology
[DE82-018615] N83-27802

PLASTIC PROPERTIES
User's manual for MODCAL: Bounding surface soil plasticity model calibration and prediction code, volume 2
[AD-A124867] N83-27523

PLASTICS
Development of improved plastic piping materials and systems for fuel gas distribution
[PB83-161109] N83-27079
Heat mirrors on plastic sheet using transparent oxide conducting coatings N83-27364

PLATINUM
Intercomparison of water triple point cells and standard platinum resistance thermometers
[DE83-005971] N83-27196

PLETHYSMOGRAPHY
Apparatus for determining changes in limb volume
[NASA-CASE-MSC-18759-1] N83-27578

PLOTTERS
The X-Y digital plotter as an output unit for the CDRA 1325 digital computers
[AD-A124799] N83-27608
Automated C-V and Y omega meson curves for MOS device analysis
[DE82-014268] N83-27886

PLOTTING
The ISOLR: An isometric plotting package for use with ORPLOT
[DE82-015819] N83-27627

PLUMES
DIF1: A dispersion program which can handle pollution and reflection
[ATMOS/82/11] N83-27478

PLUTONIUM
Gamma-ray for simultaneous calorimetric assay
[DE82-008615] N83-27826

PNEUMATIC EQUIPMENT
Pneumatic conveying of coal and coal-limestone mixtures as applied to atmospheric fluidized-bed combustion
[DE82-015694] N83-27243

POLAR REGIONS
SAM 2 measurements of the polar stratospheric aerosol. Volume 3: October 1979 to April 1980
[NASA-RP-1106] N83-27520

POLARIZATION (CHARGE SEPARATION)
A 750 keV RFQ linac for the AGS polarized proton program N83-27788
Low-temperature ultrasonic attenuation in rapidly cooled niobium containing oxygen and hydrogen
[DE82-012717] N83-27806

POLITICS
Energy future Santa Cruz: A citizens' plan for energy self-reliance
[PB83-136960] N83-27475

POLLUTION CONTROL
Fluidised-bed combustion. Initial results obtained in a 1-ft by 1-ft fluidised-bed combustor operating at pressures up to 20 ATM
[DE83-005956] N83-26974
An investigation of the effectiveness of smoke suppressant fuel additives for turbojet applications
[AD-A125025] N83-27034
High-temperature turbine-technology program. Phase 2: Technology test and support studies. Design and development of a regeneratively fuel cooled high temperature gas turbine combustor for operation on low Btu gas
[DE83-007342] N83-27241
Large-scale operations management test of use of the White Amur for control of problem aquatic plants. Part 4. Third year poststocking results. Volume 6. The water and sediment quality of Lake Conway, Florida
[AD-A124443] N83-27479
Sulfur control in fluidized-bed combustors: Methodology for predicting the performance of limestone and dolomite sorbents
[DE83-007658] N83-27500
Sulfur control in fluidized-bed combustors: Methodology for predicting the performance of limestone and dolomite sorbents. Addendum. Compilation of sorbent performance data from atmospheric fluidized-bed combustors
[DE83-007659] N83-27501
Organic Air Pollutants: Setting Priorities for Long Term Research Needs
[DE83-005997] N83-27507
Implications of emerging environmental-control technologies for air-pollution regulations
[DE83-005901] N83-27508
Acid rain: Control strategies for coal-fired utility boilers, volume 1
[DE83-006695] N83-27511

POLLUTION MONITORING
Pacific Northwest Laboratory report to the DOE Office of Energy Research. Part 3: Atmospheric sciences
[DE83-007472] N83-27488

POLLUTION TRANSPORT
Statistical and theoretical research N83-27487
Atmospheric diffusion in complex terrain N83-27490
Atmospheric boundary layer studies N83-27491
Atmospheric diffusion in complex terrain N83-27492
Theoretical studies and application N83-27497
New pollutant dispersion model for application in mountain valleys
[DE83-005289] N83-27509

POLOIDAL FLUX
Measurement of the helical field of JIPP T-11
[IPPJ-625] N83-27855

POLYBUTADIENE
Role of amines in adhesion of polybutadiene to glass substrates. 1: Reactions of amines during peroxide curing of polybutadiene
[AD-A121685] N83-27027
Role of amines in adhesion of polybutadiene to glass substrates. 4: The effect of amine structure and concentration on the strength of adhesion
[AD-A121686] N83-27028

POLYCRYSTALS
Propagation of creep cracks by cavitation in fine-grained materials
[DE83-005869] N83-27268
Fluxoid pinning by grain boundaries in bicrystals and polycrystals of niobium
[DE82-017406] N83-27891

POLYESTERS
Transparent heat insulating coatings on a polyester film N83-27365

POLYETHYLENE TEREPHTHALATE
Dielectrics for radiation-hard capacitors: Polyvinylidene fluoride and polyethylene terephthalate
[DE82-019903] N83-27137

POLYETHYLENES
Polymers in mechanical systems: Structure-property requirements
[DE83-005590] N83-27029

POLYMER MATRIX COMPOSITES
Fiber reinforced composite materials
[TULEA-1981-02] N83-26933

POLYMER PHYSICS
Commercial scale demonstration: Enhanced oil recovery by micellar-polymer flood
[DE82-013574] N83-27333

POLYMERIC FILMS
Continuous cable processing by the physical vapor deposition technique
[DE83-006011] N83-27003

POLYMERIZATION
Research in energetic compounds
[AD-A124911] N83-27024

POLYNOMIALS
An asymptotically orthonormal polynomial family
[AD-A125268] N83-27644
On the relationship between functions with the same optimal knots in spline with piecewise polynomial approximation
[AD-A125002] N83-27662

POLYVINYL FLUORIDE
Dielectrics for radiation-hard capacitors: Polyvinylidene fluoride and polyethylene terephthalate
[DE82-019903] N83-27137

POROSITY
Kinetics of void formation in strained metals
[ISSN-0208-5658] N83-26993
Organic solvent regeneration of granular activated carbon
[PB83-150201] N83-27078
Effect of confining pressure on pore volume in tight sandstones
[DE82-013573] N83-27524

POROUS MATERIALS
I. R. emission measurements of shocked rocket propellants by time-resolved infrared radiometry
[DE83-007356] N83-27042
MARIAH: A finite-element computer program for incompressible porous-flow problems, user's manual
[DE83-006847] N83-27167

PORTABLE EQUIPMENT
Small geothermal power plant. Portable turbine generator N83-27380
A modular system for the control of complex accelerators using portable software N83-27781

PORTS (OPENINGS)
The numerical solution of pressure oscillations in an open cavity N83-26793

POSITRON ANNIHILATION
NASA/Goddard Space Flight Center contributions to the Workshop on Positron-Electron Pairs in Astrophysics
[NASA-TM-85027] N83-27928
Pair production and annihilation in strong magnetic fields N83-27931
Low-temperature positron annihilation N83-27932
Upper limits to the annihilation radiation luminosity of Centaurus A N83-27933
Electron-positron annihilation and the cosmic X-ray background N83-27935
The origin of the galactic annihilation radiation N83-27936
Criteria for grasar action in astrophysical sources N83-27937

POTENTIAL ENERGY
Variational transition-state theory
[DE83-006003] N83-26973
Investigation of the potential functions of weakly bound diatomic molecules and laser-assisted excitive Penning ionization
[DE82-017259] N83-27833

POWDER METALLURGY
Sintering phenomena of non-oxide silicon compounds
[DE83-007332] N83-26932
Dynamic powder compaction of rapidly solidified Path A alloy with increased carbon and titanium content
[DE82-017252] N83-27008
Powder forging of compound steels, part 1
[TULEA-1982-16-PT-1] N83-27012
Powder forging of compound steels, part 2
[TULEA-1982-17-PT-2] N83-27013

POWER
Stopping powers of Zr, Pd, Cd, In and Pb for 6.5 MeV protons and mean excitation energies N83-27698

POWER LINES
Continuous cable processing by the physical vapor deposition technique
[DE83-006011] N83-27003

POWER PLANTS
Natural Bridges National Monument photovoltaic power plant operations manual
[DE82-015388] N83-27438
Sulfur control in fluidized-bed combustors: Methodology for predicting the performance of limestone and dolomite sorbents
[DE83-007658] N83-27500
Sulfur control in fluidized-bed combustors: Methodology for predicting the performance of limestone and dolomite sorbents. Addendum. Compilation of sorbent performance data from atmospheric fluidized-bed combustors
[DE83-007659] N83-27501

POWER SPECTRA
A procedure for combining acoustically induced and mechanically induced loads (first passage failure design criterion)
[NASA-CR-166824] N83-27795

POWER SUPPLIES
Operations requirements of utilities with wind-power generation
[DE83-007051] N83-27394

IEA small solar-power-system project, operation status [DE82-020001] N83-27423
Ion source development and injector design for Zebra N83-27776

PRECIPITATION (CHEMISTRY)
Sintering phenomena of non-oxide silicon compounds [DE83-007332] N83-26932

PREDICTION ANALYSIS TECHNIQUES
Hydrogen derived from ammonia: Small-scale costs [DE82-012720] N83-27040
Effects of particle characteristics on performance of RRSK PETN [DE82-018553] N83-27044
Prediction of natural convection flow pattern in low-aspect ratio enclosures [AD-A124995] N83-27161
Estimating survival probability or reliability: Simulation assessments of the Delta method, Jacknife and bootstrap [AD-A125000] N83-27249
Analysis of progressive collapse of complex structures [AD-A125266] N83-27260
Fatigue crack growth from blunt notches [GKSS-82/E/44] N83-27276
User's manual for MODCAL: Bounding surface soil plasticity model calibration and prediction code, volume 2 [AD-A124867] N83-27523
Prediction of nearshore wave transformation [AD-A125104] N83-27561
Predicting low-probability/high-consequence events [DE82-018373] N83-27688

PREDICTIONS
Prediction and measurement of optimum operating conditions for entrained coal-gasification processes [DE82-015612] N83-26972
Prediction of the seismic responses of R/C frame-coupled wall structures [PB83-149203] N83-27083
Collector trade-off study for BDM PRDA-35 application [DE82-013532] N83-27434

PRELAUNCH SUMMARIES
Ambitious STS-7 mission to feature first landing at Kennedy [NASA-NEWS-RELEASE-83-87] N83-26912

PREPARATION
Survival; motivation; preparation [FOA-C-54045-H1] N83-27598

PRESSURE DISTRIBUTION
Application of the vortex-lattice method to propeller performance analysis [AD-A124837] N83-26840

PRESSURE EFFECTS
Compound-compressible nozzle flow N83-26790
Experimental investigation of the mixing of highly swirling flows [AD-A125249] N83-27160
Effect of confining pressure on pore volume in tight sandstones [DE82-013573] N83-27524

PRESSURE GRADIENTS
The numerical solution of pressure oscillations in an open cavity N83-26793
Hydrogen transport in and through niobium [DE82-017214] N83-26980
Oblique interactions of detonation waves with explosive/metal interfaces [DE83-007119] N83-27038
A turbulence model for depth-averaged equations of motion --- water currents [TULEA-1981-07] N83-27174
Application of a new version of the k-W model of turbulence to equilibrium boundary layer flow over a flat plate with: (1) intense heat transfer and (2) streamwise adverse pressure gradients [CFD/82/14] N83-27181

PRESSURE MEASUREMENT
Analysis of STS-3 Get Away Special (GAS) flight data and vibration specification for gas payloads [NASA-TM-85000] N83-26911
Description and operating procedure for magma characterization data acquisition and control system [DE82-015653] N83-27625

PRESSURE RATIO
Revision of the shock loss re-estimation procedure of Program UDO300 utilizing a three-dimensional shock model [AD-A124926] N83-27154

PRESSURE REDUCTION
Geothermal steam separator evaluation (RP1672-1) N83-27377

PRESSURE REGULATORS
Load leveling on industrial refrigeration systems [DE82-902079] N83-27066

PRESSURE VESSELS
A new class of steels for thick-wall pressure vessels [DE83-004101] N83-26999
Analysis of elevated-temperature tensile and creep properties of normalized and tempered 2-1/4 Cr-1 Mo steel [DE82-018160] N83-27010
International Conference on Welding Technology for Energy Applications [DE83-006404] N83-27215
Creep deformation and crack growth in a low alloy steel welded pressure vessel containing defects N83-27225
Nonlinear response arising from non self-similar crack growth in finite thickness plates [DE83-005946] N83-27267

PRISMS
Determining light intensity for use with intermittent or rotating prism cameras utilizing a cinematographic light-intensity translator [DE82-015414] N83-27189

PROBABILITY DENSITY FUNCTIONS
Information theoretic detection of objects embedded in cluttered aerial scenes [AD-A124975] N83-27187
Composite beams from a statistical point of view [TULEA-1982-05-T] N83-27273

PROBABILITY DISTRIBUTION FUNCTIONS
The statistical properties of autosynchronizing scramblers --- data transmission [FUB-21-1982] N83-27120
Statistical properties of the sequences produced by additive scramblers --- data transmission [FUB-23-1982] N83-27122
One-sided tolerance limits for balanced one-way ANOVA random model [AD-A125026] N83-27669
A new goodness of fit test for the uniform distribution with unspecified parameters [AD-A124835] N83-27680
Acceptance control charts based on the exact and normal approximations to the binomial distributions [AD-A124964] N83-27686
A simple approximation for bivariate normal probabilities [AD-A125033] N83-27687
Approximation methods for the distribution of random sums N83-27692

PROBABILITY THEORY
Periodic renewal theory [CTH-MATH-1983-5] N83-27675
Predicting low-probability/high-consequence events [DE82-018373] N83-27688

PROBLEM SOLVING
Finite element approximation of the nonstationary Navier-Stokes problem. Part 2: Stability of solutions and error estimates uniform in time [PREPRINT-558-PT-2] N83-27179
Knowledge and skill differences in novices and experts [AD-A124466] N83-27592
Psychological and system variables in team problem solving: Experimental studies of computer-mediated participation [AD-A124924] N83-27596
A new approach for solving simultaneous resource possession problems in closed queueing networks [AD-A124877] N83-27637
Problem solving techniques for the design of algorithms [AD-A125211] N83-27643
A comparison of the finite beat conduction equation with temperature dependent conductivity [AD-A124918] N83-27647
A class of biharmonic end-striping problems arising in elasticity and Stokes flow [AD-A125305] N83-27653
On the numerical solution of some 2-D electromagnetic interface problems by the boundary collocation method [AD-A125269] N83-27666
Finite element methods for linear hyberbolic problems [CTH-MATH-1983-4] N83-27674

PROCEEDINGS
Proceedings of the 4th International Symposion on Coal-Slurry Combustion, volume 1 [DE82-016335] N83-26944

PROCESS CONTROL (INDUSTRY)
Prediction and measurement of optimum operating conditions for entrained coal-gasification processes [DE82-015612] N83-26972
Production techniques for high volume sputtered films N83-27367
Bringing a large computer network into FOCUS [DE82-010412] N83-27635

PRODUCT DEVELOPMENT
Scanning beam antenna conceptual design for 20/30 GHz satellite systems N83-26889
Multimission advanced configuration N83-26890
Large space antenna communications systems: Integrated Langley Research Center/Jet Propulsion Laboratory technology development activities. 1: Introduction N83-26891
Large space antenna communications systems: Integrated Langley Research Center/Jet Propulsion Laboratory development activities. 2: Langley Research Center activities N83-26892
Present situation in development of automated machining systems in Europe and America [PNR-90152] N83-27068

PRODUCTION ENGINEERING
Present situation in development of automated machining systems in Europe and America [PNR-90152] N83-27068
Time characteristic, capacity and conditions for the adoption of flexible production systems --- for metal working [PNR-90156] N83-27071
Investigation into the availability levels of flexible production systems [PNR-90157] N83-27902

PRODUCTION PLANNING
Production planning, production systems for flexible automation [PNR-90150] N83-27067
Example of a planned and implemented flexible manufacturing system suitable for development in stages [PNR-90154] N83-27070

PROGRAM VERIFICATION (COMPUTERS)
Verification studies of entrained-flow gasification and combustion systems with the SIMMER-II code [DE82-012148] N83-26978
Micro Focus Ltd., INTEL MDS 231 (8080A), CIS COBOL V. 4.5 Rev 1 (COBOL technical report) [PB83-155788] N83-27612
Program visualization [AD-A125291] N83-27621
Micro Focus Ltd., INTEL series 2, level 2 COBOL V.2.2 [PB83-147603] N83-27632

PROGRAMMING LANGUAGES
Determining light intensity for use with intermittent or rotating prism cameras utilizing a cinematographic light-intensity translator [DE82-015414] N83-27189
SCRAP: A language for systems programming [CSIR-TWISK-263] N83-27614
Efficiency considerations for C programs on a VAX (trademark) 11/780 [AD-A125209] N83-27617
The performance measurement of a relational database system using monitoring and modeling techniques [AD-A124919] N83-27910
SAM: A semantic association model for corporate and scientific/statistical database [DE83-006510] N83-27916

PROJECT MANAGEMENT
Technical and management support for the development of small wind systems [DE83-007197] N83-27461

PROJECT PLANNING
Definition of technology development missions for early space station satellite servicing, volume 1 [NASA-CR-170786] N83-26850
Definition of technology development missions for early space station satellite servicing, volume 2 [NASA-CR-170787] N83-26851

PROJECTILES
Inner-shell ionization and stopping power N83-27704
Perturbed stationary-state description of the polarization effect in innershell ionization N83-27705

PROPAGATION MODES
Some simple formulae for normal mode wave numbers, cutoff frequencies and the number of modes trapped by a sound channel [AD-A124948] N83-27798

PROPAGATION VELOCITY
Determining velocities by propagation [AD-A124889] N83-27849

PROPANE
Laboratory tests at elevated pressures of a silane igniter system for in-situ coal gasification [DE83-007217] N83-27450

PROPELLANT COMBUSTION
Boron-containing fuel-rich HTBP propellants. Manufacturing, burning experiments and specific impulse calculations [FOA-C-20483-D1] N83-27055

PROPELLANT GRAINS
Analytical design for internal burning star grains of solid rockets [AD-A124826] N83-27032

PROPELLER BLADES
Application of the vortex-lattice method to propeller performance analysis
[AD-A124837] N83-26840
PROPELLER EFFICIENCY
Open water experiments on an ROV thruster --- Remotely Operated (underwater) Vehicle (ROV)
[NMI-R-143] N83-27212
PROPULSION SYSTEM CONFIGURATIONS
Large space systems auxiliary propulsion requirements N83-26864
Advanced propulsion concepts for orbital transfer vehicles
[NASA-TM-83419] N83-26924
PROPULSION SYSTEM PERFORMANCE
Some advantages of unsteady aerodynamics N83-26808
Effects of varying podded nacelle-nozzle installations on transonic aeropropulsive characteristics of a supersonic fighter aircraft
[NASA-TP-2120] N83-26821
Aeronautical Knowledge (selected articles)
[AD-A123935] N83-26925
PROTECTIVE COATINGS
Processing of fused silicide coatings for carbon-based materials
[NASA-TM-83362] N83-27019
Curved film cooling admission tube
[NASA-CASE-LEW-13174-1] N83-27144
PROTON BEAMS
Proceedings of the 1981 Linear Accelerator Conference
[DE82-013754] N83-27724
LAMPF: Proposal status and summaries
[DE82-015887] N83-27841
PROTON ENERGY
The pulsed proton prototype of a high current ion linac N83-27747
Properties of a 0-mode RFQ structure and recent experimental results N83-27748
PROTONS
Stopping powers of Zr, Pd, Cd, In and Pb for 6.5 MeV protons and mean excitation energies N83-27698
Geometrical effect on stopping power measurement (angle dependent energy loss) of 7 MeV protons N83-27699
Computer simulation of geometrical effects on the stopping power for 7 MeV protons N83-27700
Statistical treatment of misalignments in linear accelerators N83-27757
PROTOTYPES
Data report for the Northeast Residential Experiment Station, March 1982
[DE82-018134] N83-27397
Design of a prototype universal network interface device using INTEL 8086 and 8089 16-bit microprocessors
[AD-A124834] N83-27606
PSYCHOLOGY
Components of mental imagery representation
[AD-A124616] N83-27591
PUBLIC HEALTH
Environmental safety and health requirements. Intermediate level skills training program
[DE82-013800] N83-27503
PUBLIC LAW
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984 N83-27919
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984: National Aeronautics and Space Administration N83-27920
PULSARS
Pair production near threshold in pulsar magnetic fields N83-27934
PULSE AMPLITUDE
Stopping powers of Zr, Pd, Cd, In and Pb for 6.5 MeV protons and mean excitation energies N83-27698
PULSE CODE MODULATION
Shock-hardened, high-frequency, PCM system with memory for Earth-penetrator-study applications
[DE82-017644] N83-27242
PULSE DURATION
Thermoelastic response to a short laser pulse
[AD-A125247] N83-27203
Brillouin backscatter from gas-jet targets illuminated by a multi-line laser source
[DE82-012586] N83-27206
PULSE GENERATORS
Overview of pulsers for nanosecond gating of image-shutter tubes
[DE82-019533] N83-27850
PULSE POSITION MODULATION
Restoration of pulse position modulated signal in a high noise environment
[AD-A124902] N83-27099
PULSE RATE
The pulsed proton prototype of a high current ion linac N83-27747
PULSED LASERS
A free electron laser driven by a long pulse induction linac
[AD-A125221] N83-27202
Thermoelastic response to a short laser pulse
[AD-A125247] N83-27203
Melt depth and regrowth kinetics in pulsed laser annealing of silicon and gallium arsenide
[DE83-005192] N83-27205
Brillouin backscatter from gas-jet targets illuminated by a multi-line laser source
[DE82-012586] N83-27206
PULSED RADIATION
Proceedings of the Los Alamos Neutrino Workshop
[DE83-000427] N83-27812
PUNCHED TAPES
The X-Y digital plotter as an output unit for the CDRA 1325 digital computers
[AD-A124799] N83-27608
PURITY
Geothermal steam separator evaluation (RP1672-1) N83-27377
PYRAMIDS
Using pyramids to detect good continuation
[AD-A124848] N83-27616
PYRITES
Preparation and characterization of glassy and crystalline mixed chalcopyrite semiconducting compounds
[DE83-005352] N83-27689
PYROLYSIS
Synthetic-fuel combustion: Pollutant formation. Scot-initiation mechanisms in burning aromatics
[DE83-005611] N83-26945
Flash pyrolysis and hydropyrolysis of biomass
[DE82-015807] N83-26951
Gasification in pulverized coal flames. Investigation of pulverized coal-combustors and gasifiers: Multiple sub-reactor model and experimental results, part 2
[DE82-013001] N83-26965
Fundamental pyrolysis studies
[DE82-009808] N83-26969
Hydropyrolysis of biomass and related materials for the production of liquids
[DE82-012928] N83-27402
PYROMETERS
Intercomparison of water triple point cells and standard platinum resistance thermometers
[DE83-005971] N83-27196

Q

QUADRUPOLES
Proceedings of the 1981 Linear Accelerator Conference
[DE82-013754] N83-27724
Octupole focusing in transport and acceleration systems N83-27731
Matching the RF quadrupole beam to the drift tube section in the FMIT accelerator N83-27732
First results on BNL H- MEQALAC --- multiple-beam electrostatic quadrupole array linear accelerator N83-27746
Loop coupling to a Radio Frequency Quadrupole resonator (RFQ) N83-27766
Low frequency RFQ linacs for heavy ion fusion N83-27767
Design of REC permanent magnet quadrupoles taking into account B, H non-linearity N83-27770
Focussing considerations in the race track microtron and double-sided microtron N83-27774
An analytical solution for the electrical properties of a Radio Frequency Quadrupole (RFQ) with simple vanes N83-27785
An RFQ linac for heavy ion acceleration N83-27787
A 750 keV RFQ linac for the AGS polarized proton program N83-27788
New formulation of the RFQ radial matching section N83-27789
Buncher section optimization of heavy ion RFQ linacs N83-27790
QUALITY CONTROL
Processes quality assurance and examination of weld metal overlays N83-27220
Acceptance control charts based on the exact and normal approximations to the binomial distributions
[AD-A124964] N83-27686
Documenting content of technical databases
[DE82-017526] N83-27914
QUANTITATIVE ANALYSIS
Quantitative analysis of phosphosilicate glass films on silicaon wafers
[DE82-017642] N83-26953
On the quantitative analysis of liquid flow in physiological tubes
[AD-A125284] N83-27155
QUANTUM CHEMISTRY
Degenerate perturbation theory
[DE82-019555] N83-27665
QUANTUM CHROMODYNAMICS
Proceedings of the Los Alamos Neutrino Workshop
[DE83-000427] N83-27812
QUANTUM MECHANICS
Eigenvalue problem for Hermitian matrices with time-reversal symmetry
[DE83-005629] N83-27695
Diffractive interactions of hadrons at high energies
[DE82-019463] N83-27830
QUANTUM THEORY
A finite-particle-number approach to physics
[DE83-007014] N83-27791
QUENCHING (ATOMIC PHYSICS)
Low-temperature ultrasonic attenuation in rapidly cooled niobium containing oxygen and hydrogen
[DE82-012717] N83-27806
QUENCHING (COOLING)
A study of the effect of interrupted quenches on a thermomechanically processed high carbon steel
[AD-A124985] N83-26996
QUEUEING THEORY
DPSNA-1: A simulation model for queueing networks with limited capacity and repetition of service demand calls --- packet switching networks
[FUB-19-1932] N83-27118
A new approach for solving simultaneous resource possession problems in closed queueing networks
[AD-A124877] N83-27637

R

RACETRACKS (PARTICLE ACCELERATORS)
Operating experience with MAMI 1 N83-27729
RACKS (GEARS)
Wave forces on circular cylinders with large excrescences at low Keulegan and Carpenter numbers --- water waves
[NMI-R-133] N83-27254
RADAR TRACKING
Post-flight trajectory reconstruction of a maneuvering reentry vehicle from radar measurements
[AD-A124805] N83-26852
RADIAL FLOW
Effects of radial support stems on the disk-and-washer structure N83-27743
RADIANCE
METCOR4: A program to simulate METSAT data
[E83-10313] N83-27302
Study to assess the importance of errors introduced by applying NOAA 6 and NOAA 7 AVHRR data as an estimator of vegetative vigor: Feasibility study of data normalization
[E83-10346] N83-27321
RADIANT COOLING
Solar-assisted water-source heat pump
[DE83-006023] N83-27457
RADIANT FLUX DENSITY
The DMSP/MFR total ozone and radiance data base
[NASA-CR-170370] N83-27531
High-power-density approaches to magnetic fusion energy: Problems and promise of compact Reversed-Field Pinch Reactors (CRFPR)
[DE82-015736] N83-27861
Stability and confinement of spheromaks and field-reversed configurations
[DE82-018378] N83-27862
RADIATION DAMAGE
LAMPF: Proposal status and summaries
[DE82-015887] N83-27841
Mechanisms of electronic description
[DE82-018590] N83-27887
RADIATION DETECTORS
Place of HgI2 energy-dispersive X-ray detectors
[DE82-017651] N83-27193
RADIATION DOSAGE
Subtle consequences of exposure to weak microwave fields: Are there non-thermal effects?
[AD-A125169] N83-27090
Responses of airborne biota to microwave transmission from satellite power system
[DE83-006495] N83-27498
Investigation of adaptive processes in peripheral blood using mathematical modeling methods N83-27575

Function of adreno-pituitary system in various regimes of effect of alternating magnetic field of industrial frequency N83-27576
Ionization by fast charged particles [DE82-014849] N83-27823

RADIATION EFFECTS
Spacecraft material: research: A NASA perspective N83-26866
Spacecraft material applications: Long-term stability questions N83-26867
Subtle consequences of exposure to weak microwave fields: Are there non-thermal effects? [AD-A125169] N83-27090
Pacific Northwest Laboratory report to the DOE Office of Energy Research. Part 2: Environmental sciences [DE83-007586] N83-27481
Responses of airborne biota to microwave transmission from satellite power system [DE83-006495] N83-27498
A review of the current state of European research and knowledge concerning the biological effects of radiowaves and microwaves [AD-A125205] N83-27582
Error analysis and prevention of cosmic ion-induced soft errors in static CMOS RAMS [DE82-018967] N83-27610
Microcircuit radiation effects databank [NASA-TM-85346] N83-27903

RADIATION HARDENING
Use of microhardness to determine the strengthening and microstructural alterations of 14-MeV-neutron-irradiated metals [DE82-014002] N83-27000
Dielectrics for radiation-hard capacitors: Polyvinylidene fluoride and polyethylene terephthalate [DE82-019903] N83-27137

RADIATION HAZARDS
Laser safety of air bathymetry [FOA-C-30292-E1] N83-27210
A review of the current state of European research and knowledge concerning the biological effects of radiowaves and microwaves [AD-A125205] N83-27582

RADIATION MEASUREMENT
EMI measurements of lightning systems N83-27109

RADIATION SHIELDING
Nuclear reactor system study for NASA/JPL [NASA-CR-172631] N83-27836
Space reactors [DE82-019187] N83-27837

RADIATION TRANSPORT
Numerical simulations for intense light-ion beam propagation in channel under influence of plasma inertia [IPPJ-627] N83-27854

RADIATIVE HEAT TRANSFER
Solar-assisted water-source heat pump [DE83-006023] N83-27457

RADIO ASTRONOMY
Persistent 1.5s oscillations superimposed at a solar burst observed at two mm-wavelengths [INPE-2737-PRE/317] N83-27948

RADIO COMMUNICATION
Large spaceborne antenna technology: A system perspective N83-26854
Land mobile satellite system requirements N83-26855

RADIO EMISSION
Correlating radio emissions with visible emissions from individual solar active regions [AD-A124892] N83-27949

RADIO FREQUENCIES
Biological effects of radio-frequency radiation N83-27105
Octupole focusing in transport and acceleration systems N83-27731
The pulsed proton prototype of a high current ion linac N83-27747
On space charge instabilities and emittance growth in RF linacs N83-27752
Cavity loading associated with high-current RF linacs N83-27754
Beam dynamics studies of high current RFQ and DTL tanks N83-27756
The RF system of the photon factory injector linac N83-27761
Design considerations for a developmental high power coupling loop to drive a resonant load N83-27762
Loop coupling to a Radio Frequency Quadrupole resonator (RFQ) N83-27766
A program development for SUPERFISH N83-27768
An analytical solution for the electrical properties of a Radio Frequency Quadrupole (RFQ) with simple vanes N83-27785
An RFQ linac for heavy ion acceleration N83-27787
A 750 keV RFQ linac for the AGS polarized proton program N83-27788
New formulation of the RFQ radial matching section N83-27789
Buncher section optimization of heavy ion RFQ linacs N83-27790

RADIO FREQUENCY HEATING
On the numerical solution of some 2-D electromagnetic interface problems by the boundary collocation method [AD-A125269] N83-27666
Low energy 100 percent duty factor Alvarez linacs at Chalk River N83-27726
Matching the RF quadrupole beam to the drift tube section in the FMIT accelerator N83-27732
Dead beat filling and feedforward RF control for the spallation neutron source SNQ N83-27733

RADIO FREQUENCY INTERFERENCE
Reduction of AM radio interference through control of radiated electric field N83-27106
Electrical system waveform distortion N83-27107

RADIO TRANSMISSION
Audio direct broadcast satellites N83-26857

RADIO WAVES
RF radiation from lightning correlated with aircraft measurements during storm hazards-82 [NASA-TM-85007] N83-27537

RADIOACTIVE ISOTOPES
Radiolabelling of chemicals [DE82-017576] N83-26949

RADIOACTIVE WASTES
Laboratory simulation of a deep-ocean in-situ heat-transfer experiment [DE82-018656] N83-27171
Figure-of-merit analysis and cost effectiveness of low-level radioactive waste treatment systems [DE82-018890] N83-27838
Low-level radioactive waste disposal. Study of a conceptual nuclear energy center at Green River, Utah [DE83-006835] N83-27844

RADIOBIOLOGY
USSR report: Life sciences. Effects of nonionizing electromagnetic radiation, no. 9 [JPRS-83601] N83-27572

RADIOMETERS
I. R. emission measurements of shocked rocket propellants by time-resolved infrared radiometry [DE83-007356] N83-27042
Statistical Techniques Applied to Aerial Radiometric Surveys (STAARS): Application of the Huber M-estimator to aerial radiometric data for the identification of host and source areas for uranium deposits [DE82-018199] N83-27335

RADIOMETRIC CORRECTION
Study to assess the importance of errors introduced by applying NOAA 6 and NOAA 7 AVHRR data as an estimator of vegetative vigor: Feasibility study of data normalization [E83-10346] N83-27321

RADIOMETRIC RESOLUTION
Study on spectral/radiometric characteristics of the thematic mapper for land use applications [E83-10348] N83-27323

RAIN
Contrasts between wet and dry periods within the 1981 rainy season in northeast Brazil [INPE-2728-PRE/310] N83-27539

RAIN FORESTS
Monitoring tropical vegetation succession with LANDSAT data [E83-10306] N83-27296

RAMAN SPECTROSCOPY
Molecular dynamics of chemical reactions in solution [AD-A124953] N83-26941
High-resolution stimulated Raman spectroscopy [DE82-013490] N83-26956
Simultaneous multipoint measurements of density gradients and temperature in a flame [DE83-007291] N83-26975

RAMJET ENGINES
Dynamic response of ramjet inlets to downstream perturbations [AD-A125295] N83-27157

RAMJET MISSILES
Coaxial dump combustor investigations N83-26791

RANDOM ACCESS MEMORY
Error analysis and prevention of cosmic ion-induced soft errors in static CMOS RAMS [DE82-018967] N83-27610

RANDOM NOISE
Restoration of pulse position modulated signal in a high noise environment [AD-A124902] N83-27099

RANDOM NUMBERS
An efficient algorithm for generating random number pairs drawn from a bivariate normal distribution [NASA-TP-2173] N83-27679

RANDOM VARIABLES
Identifiabilty and estimation in random translations of marked point processes [AD-A125313] N83-27652
Approximation methods for the distribution of random sums N83-27692

RANKINE CYCLE
Electrofluid dynamics: The role of Hans von Ohain N83-26788
Phase 2 Brayton/Rankine 10-ton gas-fired space-conditioning system [DE82-016367] N83-27355
Conceptual design of the Truscott Brine Lake solar pond system. Volume 2: Utility-integrated scenario [DE83-008133] N83-27386
Concept evaluation of automotive propulsion using liquid air/nitrogen [DE82-016992] N83-27927

RARE GASES
Nuclear magnetic resonance gyroscope [AD-A124925] N83-27185
Effective charge of low-velocity nitrogen, neon and argon ions in carbon, aluminum and gold N83-27716

RAY TRACING
Ray tracing in dissipative media [KGI-PREPRINT-060] N83-27112

REACTION KINETICS
Molecular dynamics of chemical reactions in solution [AD-A124953] N83-26941
Synthetic-fuel combustion: Pollutant formation. Scot-initiation mechanisms in burning aromatics [DE83-005611] N83-26945
Gasification in pulverized coal flames. Investigation of pulverized coal-combustors and gasifiers: Multiple sub-reactor model and experimental results, part 2 [DE82-013001] N83-26965
Variational transition-state theory [DE83-006003] N83-26973
Hydrogen transport in and through niobium [DE82-017214] N83-26980
Role of amines in adhesion of polybutadiene to glass substrates. 4: The effect of amine structure and concentration on the strength of adhesion [AD-A121686] N83-27028
Thermochemistry of mixed explosives [DE82-012149] N83-27045
A general-purpose computer code for predicting chemical-kinetic behavior behind incident and reflected shocks [DE82-015878] N83-27169
Application of numerical simulation methodology to automotive combustion [DE82-015912] N83-27247
Biosolar hydrogen and oxygen production [DE82-017491] N83-27428
Photosynthetic water splitting [DE82-017315] N83-27429
Addition of devolatilization equations to SYNTHANE computerized mathematical model [DE83-006243] N83-27444
Organic Air Pollutants: Setting Priorities for Long Term Research Needs [DE83-005997] N83-27507
Rate processes in gas phase [NASA-RP-1090] N83-27809

REACTOR DESIGN
Status report on operation and upgrading of the Unilac N83-27727
The linear accelerator for the proposed German spallation source N83-27728
Operating experience with MAMI 1 N83-27729
Status of the Argonne superconducting-linac heavy-ion booster N83-27730
Preaccelerator design and component development for the SNQ linear accelerator N83-27734
Use of the regularization method for designing the equilibrium system of a Tokamak reactor having a specified plasma geometry [BLL-CTO-2117-(9091.9F)] N83-27851

REACTOR MATERIALS
Materials and welding process development for nuclear application in the Federal Republic of Germany N83-27217
Welding technologies and materials for energy applications in Japan N83-27218
Nonlinear response arising from non self-similar crack growth in finite thickness plates [DE83-005946] N83-27267

REACTOR SAFETY
Nuclear reactor system study for NASA/JPL [NASA-CR-172631] N83-27836
Space reactors [DE82-019187] N83-27837

REACTOR TECHNOLOGY
Engineering Research Division publication report, calendar year 1981 --- bibliography
[DE82-016086] N83-27265
Papers on techniques of program design
[ISSN-0208-5658] N83-27613
Recent results on the dense Z-pinch
[DE82-015802] N83-27859
High-power-density approaches to magnetic fusion energy: Problems and promise of compact Reversed-Field Pinch Reactors (CRFPR)
[DE82-015736] N83-27861
READERS
Automatic threshold design for a bound document scanner
[AD-A125316] N83-27913
REAL TIME OPERATION
Improvement of fusion welding through modelling, measurement and real-time control N83-27226
A visit to the Computer Science Department
[AD-A124855] N83-27607
RECEIVERS
Test operations procedures
[AD-A124797] N83-27092
Restoration of pulse position modulated signal in a high noise environment
[AD-A124902] N83-27099
RECOMBINATION REACTIONS
Cost/design study and fabrication/testing of a 300-W gas-recombination device for utility lead-acid cells
[DE82-019800] N83-27468
RECOVERY
Terrestrial and riverine ecology N83-27482
Marine research N83-27483
RECTANGLES
Detectability of defects by thermal non-destructive testing
[AERE-R-10802] N83-27250
RECTANGULAR WINGS
Some recent applications of XTRAN3S
[NASA-TM-85641] N83-26815
RECTIFIERS
The development of a reduced-order functional representation of an alternator-rectifier excitation system aut 01Chen-Chen
[DE83-006437] N83-27133
RECYCLING
Plating wastes survey
[AD-A125230] N83-27480
REDOX CELLS
Zirconium carbide as an electrocatalyst for the chromous-chromic redox couple
[NASA-CASE-LEW-13246-1] N83-27344
REENTRY PHYSICS
Constant parameter two component channel flows N83-26797
REFLECTANCE
Effect of frequency-dependent soil parameters on reflection coefficients
[AD-A124798] N83-27091
Melt depth and regrowth kinetics in pulsed laser annealing of silicon and gallium arsenide
[DE83-005192] N83-27205
Atmospheric effects on METSAT data
[E83-10314] N83-27303
Study to assess the importance of errors introduced by applying NOAA 6 and NOAA 7 AVHRR data as an estimator of vegetative vigor: Feasibility study of data normalization
[E83-10346] N83-27321
REFLECTED WAVES
A general-purpose computer code for predicting chemical-kinetic behavior behind incident and reflected shocks
[DE82-015878] N83-27169
REFLECTING TELESCOPES
Structures for large precision reflectors N83-26871
Survey of deployable antenna concepts N83-26872
REFLECTION
Development of improved analytical models for mesh reflector surfaces N83-26895
DIF1: A dispersion program which can handle pollution and reflection
[ATMOS/82/11] N83-27478
REFLECTORS
Large deployable reflector: An infrared and submillimeter orbiting observatory N83-26858
A 15-meter deployable aperture microwave radiometer N83-26862
Status of deployable geo-truss development N83-26875
Inflated antennas N83-26877
Electrostatically figured membrane reflectors: An overview N83-26878
Development of improved analytical models for mesh reflector surfaces N83-26895
Phased array-fed antenna configuration study
[NASA-CR-168077] N83-27086
Large Deployable Reflector Science and Technology Workshop. Volume 2: Scientific Rationale and Technology Requirements
[NASA-CP-2275] N83-27939
REFRACTIVITY
Degradation of a laser beam by a turbulent jet N83-26799
An analysis of the Wyngaard-LeMone model of refractive index and micrometeorological structure functions at the top of a turbulent mixed layer
[AD-A123986] N83-27548
REFRIGERATING MACHINERY
Load leveling on industrial refrigeration systems
[DE82-902079] N83-27066
REFRIGERATORS
Engineering and manufacture of a high-efficiency, automatic defrosting refrigerator-freezer
[DE82-017480] N83-27065
REGENERATION (ENGINEERING)
Organic solvent regeneration of granular activated carbon
[PB83-150201] N83-27078
REGGE POLES
Diffractive interactions of hadrons at high energies
[DE82-019463] N83-27830
REGRESSION ANALYSIS
Evaluation of trends in wheat yield models
[E83-10349] N83-27324
On the relationship between functions with the same optimal knots in spline with piecewise polynomial approximation
[AD-A125002] N83-27662
Unsteady models, vectorial autoregressive models, and Levinson's algorithm
[ENST-D-82005] N83-27676
Correlating radio emissions with visible emissions from individual solar active regions
[AD-A124892] N83-27949
REGULATIONS
City of Tucson solar code
[DE82-016788] N83-27418
RELATIVISTIC ELECTRON BEAMS
Recent work on collective accelerators N83-27771
High-average-power electron accelerators for generating gigawatt microwave pulses
[DE83-006808] N83-27821
RELATIVITY
Discussions with Jens
[DE82-016622] N83-27896
RELAXATION (MECHANICS)
Low-temperature ultrasonic attenuation in rapidly cooled niobium containing oxygen and hydrogen
[DE82-012717] N83-27806
RELIABILITY
Probabilistic design using numerical optimization
[AD-A125232] N83-27651
RELIABILITY ANALYSIS
Highlights of an ejector analysis N83-26804
Reliability aspects of structural control
[PB83-145482] N83-27082
Investigation into the availability levels of flexible production systems
[PNR-90157] N83-27902
RELIABILITY ENGINEERING
Demonstration and evaluation of gas turbine transit buses
[NASA-CR-165528] N83-27926
REMOTE CONSOLES
Dissemination of digital satellite imagery through telephone lines
[INPE-2725-PRE/309] N83-27089
REMOTE CONTROL
Open water experiments on an ROV thruster --- Remotely Operated (underwater) Vehicle (ROV)
[NMI-R-143] N83-27212
REMOTE MANIPULATOR SYSTEM
A robot in space as a large space structures control experiment N83-26899
REMOTE SENSING
Yield forecasting from remote sensing data: A survey of methods available in 1982 --- crop yield
[REPT-M/83/5] N83-27343
REMOTE SENSORS
Bathymetric data and analysis for the NRL remote sensing experiment: Phelps Bank, July 1992
[AD-A125220] N83-27563
REMOVAL
H2S removal from coal gas at mid temperature (150 to 200 deg C)
[DE82-011004] N83-26963
Efficiency of buffered aqueous carboxylic acid solutions and organic solvents to absorb SO2 from industrial flue; solubility data from gas-liquid chromatography
[DE83-005405] N83-27510
RESCUE OPERATIONS
Evaluation and performance of closed-circuit breathing apparatus
[DE82-015877] N83-27601
RESEARCH
Proceedings of the 4th International Symposion on Coal-Slurry Combustion, volume 1
[DE82-016395] N83-26944
Research on wall turbulence
[AD-A124831] N83-27153
Summaries of the FY 1982 Applied Mathematical Sciences Research Program
[DE83-005815] N83-27668
RESEARCH AND DEVELOPMENT
AGARD Bulletin: Meetings, publications, membership
[AGARD-BUL-83/1] N83-26786
RESEARCH MANAGEMENT
A NASA high-power space-based laser research and applications program
[NASA-SP-464] N83-27200
RESERVOIRS
Commercial scale demonstration: Enhanced oil recovery by micellar-polymer flood
[DE82-013574] N83-27333
Technical support for geopressured-geothermal-well activities in Louisiana
[DE83-005297] N83-27473
Department of Energy's Western Gas Sands Project multi-well experiment update
[DE82-018291] N83-27529
RESIDENTIAL AREAS
Effects of autocorrelation upon LANDSAT classification accuracy --- Richmond, Virginia and Denver, Colorado
[E83-10328] N83-27312
RESIDENTIAL ENERGY
Household energy conservation: Strategies for behavioral research
[RAND/N-1909-DOE] N83-27349
An appraisal of evaluations of utility sponsored programs for residential energy conservation
[RAND-N-1925-DOE] N83-27350
Data report for the Northeast Residential Experiment Station, March 1982
[DE82-018134] N83-27397
Data report for the Southwest Residential Experiment Station, February 1982
[DE82-016330] N83-27398
Residential photovoltaic system simulation: Thermal aspects
[DE82-007784] N83-27399
Final materials, processes, and testing progress report for residential and non-residential applications
[DE82-017285] N83-27427
Domestic olivine versus magnesite as a thermal energy storage material: Performance comparisons for electrically heated room-size units in accordance with ASHRAE standard 94.2
[DE82-017389] N83-27466
Energy future Santa Cruz. A citizens plan for energy self-reliance: Executive summary
[PB83-136978] N83-27474
RESIDUAL STRESS
Effect of joint design and fabrication limitations on tube-to-tubesheet welding N83-27235
The analysis of residual stresses according to the Phi Psi Xi method with data compensation through ellipses
[NRC/CNR-TT-2061] N83-27257
Numerics of measuring residual stresses in near-surface layers by means of X-ray diffraction analysis. Part 1: Constant and inclined stress distribution
[NRC/CNR-TT-2060] N83-27258
RESIN MATRIX COMPOSITES
Ultrasonic mixing of epoxy curing agents
[NASA-TM-85643] N83-27018
RESONANCE
Applications of resonance-averaged gamma-ray spectroscopy with tailored beams
[DE82-018098] N83-26955
Dynamics of three-dimensional disturbances in water table flow --- water waves
[TULEA-1982-36-T] N83-27175
Photon-photon collisions
[DE83-007011] N83-27813
RESONANCE TESTING
Construction of a high-power RF resonant test load N83-27740
RESONANT FREQUENCIES
ULTRAFISH: Generalization of SUPERFISH to m equal to or less than 1 N83-27749
Cavity loading associated with high-current RF linacs N83-27754
A program development for SUPERFISH N83-27768
Measurement of model inter-digital H type linac N83-27786

Computerized measurement and tracking of acoustical resonances
[AD-A125286] N83-27799

RESONANT VIBRATION
Vibration analysis of a spinning disk using image derotated holographic interferometry N83-26811
A method for testing components in the high acceleration frequency range
[TULEA-1981-18] N83-27269

RESONATORS
Properties of a 0-mode RFQ structure and recent experimental results N83-27748
Low-cost megawatt RF power sources for linear accelerators to 70MHz and above
[LBL-13024] N83-27784

RESOURCES MANAGEMENT
Assessment of water use impacts from solar-energy development
[DE83-004888] N83-27448
Project scheduling with resource considerations
[AD-A124938] N83-27901

RETARDING
Boundary conditions for suppressing rapidly moving components in hyperbolic systems, 1
[AD-A120962] N83-27164

RETINAL IMAGES
The role of convergence in stereoscopic depth constancy
[AD-A124231] N83-27590

RETROFITTING
The use of vortex generators as inexpensive compressor casing treatment N83-26798
Handbook of thermal insulation applications
[AD-A125264] N83-27158
Energy future Santa Cruz. A citizens plan for energy self-reliance: Executive summary
[PB83-136978] N83-27474

REVERSE FIELD PINCH
Experimental studies on energy transport in a reversed field theta pinch
[IPPJ-626] N83-27853
Plasma behaviors in the open field region of reversed-field theta-pinch
[IPPJ-624] N83-27856
High-power-density approaches to magnetic fusion energy: Problems and promise of compact Reversed-Field Pinch Reactors (CRFPR)
[DE82-015736] N83-27861
Compact toroid experiments: Spheromaks and field-reversed configurations
[DE82-015882] N83-27865

REYNOLDS NUMBER
On Synge's criterion for the stability of plane Couette flow N83-26802
Interference effects on the drag loading for groups of cylinders in uni-directional flow --- water waves, offshore structures
[NMI-R-130] N83-27147

RHEOLOGY
Thermophysical properties of coal liquids
[DE82-013366] N83-26967
Proceedings of the Fourth International Symposium on Coal-Slurry Combustion, volume 4
[DE82-016336] N83-26983
Elongational viscosity rheological parameter study
[AD-A125265] N83-27261

RHODE ISLAND
Geology and mineral resources of the Providence 1 deg by 2 deg NTMS quadrangle, Connecticut-Massachusetts-Rhode Island N83-27331

RIBS (SUPPORTS)
Wrap-rib antenna concept development overview N83-26873
Auxiliary propulsion requirements for large space systems
[NASA-TM-83388] N83-26922

RIGID STRUCTURES
The influence of some second order effects on the behaviour of rigid plastic shells at the yield point load
[ISSN-0208-5658] N83-27252

RINGS (MATHEMATICS)
A categorized theory of bilinear systems over a ring
[CSIR-TWISK-264] N83-27638

ROBOTS
A robot in space as a large space structures control experiment N83-26899
Robotics in welding N83-27227
Quaternions in computer vision and robotics
[AD-A125876] N83-27600

ROCK INTRUSIONS
The Ponta Grossa Arch: A proposal for ts configuration and evolution from the interpretation of remote sensing data
[E83-10343] N83-27320

ROCKET PROPELLANTS
I. R. emission measurements of shocked rocket propellants by time-resolved infrared radiometry
[DE83-007356] N83-27042

ROCKS
Acoustic emissions during deformation of intact and jointed welded tuff
[DE82-018346] N83-27805

RODS
Determination of mechanical impedance through strain measurement on an impacted slender rod
[TULEA-1982-33-T] N83-27274
A FRQ concept using circular rods N83-27744

ROLL FORMING
Vacuum roll coating equipment N83-27369

ROLLER BEARINGS
Rolling-element bearings
[NASA-RP-1105] N83-27214

ROOMS
Matching based interactive facility layout
[AD-A124958] N83-27609

ROTARY WING AIRCRAFT
Research and analysis of head-directed area-of-interest visual system concepts
[NASA-CR-166480] N83-26849

ROTARY WINGS
Experimental study of main rotor/tail rotor/airframe interactions in hover. Volume 1: Text and figures
[NASA-CR-166485] N83-26820
Simulation program of rotary wings
[FOA-C-30308-E1] N83-26836

ROTATING DISKS
Vibration analysis of a spinning disk using image derotated holographic interferometry N83-26811

ROTATING PLASMAS
Plasma behaviors in the open field region of reversed-field theta-pinch
[IPPJ-624] N83-27856

ROTATION
Moment-rotation characteristics of semi-rigid steel beam-column connections
[PB83-145318] N83-27081
The role of rotational degrees of freedom in heavy-ion collisions
[DE82-015751] N83-27820

ROTOR BLADES (TURBOMACHINERY)
End wall flow characteristics and overall performance of an axial flow compressor stage
[NASA-CR-3671] N83-26819

RUNGE-KUTTA METHOD
A general approach to the testing of binary solubility systems for thermodynamic consistency. Consolidated Fuel Reprocessing Program
[DE83-007173] N83-27897

S

SAFETY
Heavy-ion-spectrometer system --- operation safety procedures
[DE82-017049] N83-27190
Natural Bridges National Monument photovoltaic power plant operations manual
[DE82-015388] N83-27438
Operational readiness and the human factors environment
[DE83-005586] N83-27602

SAFETY FACTORS
Status of alcohol fuels utilization technology for highway transportation: A 1981 perspective. Volume 2: Compression-ignition engines
[DE83-006127] N83-27036
Stability and confinement of spheromaks and field-reversed configurations
[DE82-018378] N83-27862

SAFETY MANAGEMENT
Heavy-ion-spectrometer system --- operation safety procedures
[DE82-017049] N83-27190

SALINITY
On the numerical prediction of vertical turbulent exchange in stratified flows --- geophysical flows, saline water
[TULEA-1981-08] N83-27340

SANDS
Data base for hydraulically stimulated gas wells producing from tight sands formations
[DE82-013029] N83-27332

SANDSTONES
Technical support for geopressured-geothermal-well activities in Louisiana
[DE83-005297] N83-27473
Effect of confining pressure on pore volume in tight sandstones
[DE82-013573] N83-27524
Sedimentology of the Mesaverde formation of Rifle Gap, Colorado and implications for gas-bearing intervals in the subsurface
[DE82-013396] N83-27530

SATELLITE ANTENNAS
INTELSAT 6 antenna system design and development N83-26888

SATELLITE ATTITUDE CONTROL
Results of studies at Langley Research Center on the control of large space systems N83-26887

SATELLITE CONTROL
Autonomous spacecraft design and validation methodology handbook
[NASA-CR-172678] N83-26920

SATELLITE GROUND SUPPORT
Concepts for connectivity and interoperability of world space data networks: INPE proposal to CCSDS/Panel 3
[INPE-2722-PRE/307] N83-27088

SATELLITE LIFETIME
Large deployable reflector: An infrared and submillimeter orbiting observatory N83-26858

SATELLITE NETWORKS
Satellite systems requirements for land mobile communications N83-26856
Audio direct broadcast satellites N83-26857
Auxiliary propulsion requirements for large space systems
[NASA-TM-83388] N83-26922
Concepts for connectivity and interoperability of world space data networks: INPE proposal to CCSDS/Panel 3
[INPE-2722-PRE/307] N83-27088

SATELLITE OBSERVATION
Mapping from space and the SPOT project N83-27477

SATELLITE TRANSMISSION
Dissemination of digital satellite imagery through telephone lines
[INPE-2725-PRE/309] N83-27089
LANDSAT-4 to ground station interface description
[E83-10292] N83-27291

SATELLITE-BORNE INSTRUMENTS
LANDSAT-D flight segment operations manual, volume 1
[E83-10285] N83-27287
LANDSAT-D flight segment operations manual, volume 2
[E83-10286] N83-27288
LANDSAT-D flight segment operations manual. Appendix A: Coefficients/calibration data
[E83-10287] N83-27289

SCALARS
Linearized stability of extreme shock profiles for systems of conservation laws with viscosity
[AD-A125256] N83-27159

SCALE (CORROSION)
High-temperature corrosion of iron in sulfur-containing atmosphere
[DE83-006965] N83-27007
Geothermal scale control by crystallization (RP1525-2) N83-27378

SCANDIUM COMPOUNDS
The rare earth sulfides R2S/sub 3-x/(R = Sc, Er and Lu) as high temperature thermoelectric elements
[DE82-016382] N83-27396

SCATTERING CROSS SECTIONS
Fast-neutron total and scattering cross sections of elemental palladium
[DE82-019475] N83-27001
Proceedings of the Los Alamos Neutrino Workshop
[DE83-000427] N83-27812
High-energy physics at Tufts University
[DE83-007503] N83-27840
Fast-neutron scattering cross sections of elemental silver
[DE82-019477] N83-27883

SCHEDULING
Project scheduling with resource considerations
[AD-A124938] N83-27901

SCHLIEREN PHOTOGRAPHY
Recent results on the dense Z-pinch
[DE82-015802] N83-27859

SCIENTIFIC SATELLITES
Satellite applications to acoustic prediction systems
[AD-A125027] N83-27564

SCINTILLATION COUNTERS
Scintillation analysis of gamma radiation with crystals of bismuth germanate
[AD-A124991] N83-27882

SCRAMBLING (COMMUNICATION)
The statistical properties of autosynchronizing scramblers --- data transmission
[FUB-21-1982] N83-27120
Design of an additive scrambler for parallel connection with numerical multiplexers at 565 Mb/sec --- data transmission
[FUB-22-1982] N83-27121

Statistical properties of the sequences produced by additive scrambiers --- data transmission
[FUB-23-1982] N83-27122

SEA ICE
Summer decay and retreat of a sea ice cover
[AD-A125124] N83-27560
The ice conditions in the Greenland waters, 1975
[ISBN-87-7478-185-5] N83-27566

SEA WATER
The brine zone in the McMurdo Ice Shelf, Antarctica
[AD-A124516] N83-27558
Investigations of the 1 KHz sound absorption in sea water
[AD-A124888] N83-27797

SEALS (STOPPERS)
Correlation of compressive stress with spalling of plasma sprayed ceramic materials
[NASA-TM-83406] N83-27016

SEARCHING
Human information processing guidelines for decision-aiding displays
[AD-A124858] N83-27599
An empirical study of insertion and deletion in binary search trees
[AD-A125210] N83-27639

SECONDARY FLOW
Calculation of turbulence-driven secondary motion in noncircular ducts
[KU-SFB-80/T/220] N83-27178

SECURITY
Sandia Helicopter Acoustic Detector (SHAD)
[DE82-018925] N83-27803

SEDIMENTS
Laboratory simulation of a deep-ocean in-situ heat-transfer experiment
[DE82-018656] N83-27171
National Uranium Resource Evaluation Program: Supplement to hydrogeochemical and stream sediment reconnaissance basic data reports K/UR-405 and K/UR-408 through K/UR-443 GJBX-88(82)]
[DE82-013774] N83-27336
Sedimentology of the Mesaverde formation of Rifle Gap, Colorado and implications for gas-bearing intervals in the subsurface
[DE82-013396] N83-27530

SEISMIC ENERGY
The National Seismic Station
[DE82-018224] N83-27527

SEISMIC WAVES
Prediction of the seismic responses of R/C frame-coupled wall structures
[PB83-149203] N83-27083
Seismic response of port and harbor facilities
[PB83-145490] N83-27534

SELF ADAPTIVE CONTROL SYSTEMS
A flow control scheme considering retransmissions in packet switched datagram transport networks
[FUB-32-1982] N83-27125

SEMICONDUCTOR DEVICES
Development and application of fully-automated EBIC techniques for solar-cell measurements
[DE82-014409] N83-27415

SEMICONDUCTORS (MATERIALS)
Development of photoelectrochemical cells based on compound semiconductors and nonaqueous electrolytes
[DE82-013700] N83-26968
Aluminum nitride thin film and composite bulk wave resonators
[DE82-019303] N83-27135
Melt depth and regrowth kinetics in pulsed laser annealing of silicon and gallium arsenide
[DE83-005192] N83-27205
Development and application of fully-automated EBIC techniques for solar-cell measurements
[DE82-014409] N83-27415
Thermal analysis of the vertical bridgman semiconductor crystal growth technique
[NASA-CR-172627] N83-27875
Experiments with phase transitions at very high pressure — compressed solidifed gases, semiconductors, superconductors, and molecular crystals
[NASA-CR-3696] N83-27879
Preparation and characterization of glassy and crystalline mixed chalcopyrite semiconducting compounds
[DE83-005352] N83-27889

SENSITIVITY
Survivability of interdiction aircraft: Sensitivity to terrain following, command altitude, velocity and electronic counter measures
[AD-A124870] N83-26833
Sensitivity analysis for premixed, laminar, steady-state flames
[AD-A123866] N83-26938
Sensitivity of electric explosive devices to electromagnetic pulses: An estimation for assessing hazards in connection with stray fields from an electromagnetic pulse stimulator
[FOA-C-20485-D1(D4)] N83-27056
Sensitivity of Bayes inference with ignorable but data-dependent stopping rules
[AD-A125306] N83-27685

SENSORS
An experimental analysis in modern modal control
[AD-A124839] N83-26908

SEPARATED FLOW
Wind tunnel investigation of separated flow over an afterbody in supersonic axisymmetric stream utilizing one-component laser-Doppler-velocimetry
[FFA-TN-1983-10] N83-26826
Dynamic distortion in a short s-shaped subsonic diffuser with flow separation --- Lewis 8 by 6 foot Supersonic Wind Tunnel
[NASA-TM-84312] N83-26838

SEPARATION
Integrated aerodynamic tests of the space shuttle vehicle during solid rocket booster separation at Mach 4.5 (IA193)
[AD-A125297] N83-26915

SEPARATORS
Preparation, characterization, physical testing and performance of fluorocarbon membranes and separators
[NASA-CR-167880] N83-26936
Rolling-element bearings
[NASA-RP-1105] N83-27214
Wellhead power production with a rotary separator turbine (RP 1196) N83-27376
Geothermal steam separator evaluation (RP1672-1) N83-27377

SEQUENCING
Statistical properties of the sequences produced by additive scramblers --- data transmission
[FUB-23-1982] N83-27122
Periodic renewal theory
[CTH-MATH-1983-5] N83-27675

SEQUENTIAL ANALYSIS
Sufficient statistics for decentralized estimation
[AD-A124941] N83-27689

SERIES EXPANSION
Recent developments in algorithms and software for trust-region methods
[DE83-006276] N83-27667
Investigation of the potential functions of weakly bound diatomic molecules and laser-assisted excitive Penning ionization
[DE82-017259] N83-27833

SERVICES
Calibration and related measurement service of the National Bureau of Standards
[PB83-151662] N83-27199

SET THEORY
Local structure of feasible sets in nonlinear programming. Part 1: Regularity
[AD-A125244] N83-27657
STOP: A fast method of disjointing binary product sets
[DE83-007463] N83-27670
Submodular set functions, amtroids and the greedy algorithm: Tight worst-cast bounds and some generalizations of the Rado-Edmonds theorem
[AD-A124981] N83-27671

SHADOWS
Monitoring tropical vegetation succession with LANDSAT data
[E83-10306] N83-27296

SHAFTS (MACHINE ELEMENTS)
Development of variable-shaft-speed alternator
[DE82-012334] N83-27139

SHALE OIL
Explorator study of plasma arc jet shale conversion
[DE82-009090] N83-27388
Oil shale fugitive air emissions N83-27495

SHAPES
Aerodynamic characteristics of generalized bent biconic bodies for aero-assisted, orbital-transfer vehicles
[NASA-TM-84362] N83-26918

SHEAR FLOW
On the large scale structure of turbulence in boundary layer and shear flows N83-26800

SHEAR LAYERS
The numerical solution of pressure oscillations in an open cavity N83-26793
Calculation of turbulence-driven secondary motion in noncircular ducts
[KU-SFB-80/T/220] N83-27178

SHEAR PROPERTIES
Research on wall turbulence
[AD-A124831] N83-27153

SHEAR STRAIN
Bending of laminated anisotropic shells by a shear deformable finite element
[PB83-145409] N83-27278

SHEAR STRESS
On the large scale structure of turbulence in boundary layer and shear flows N83-26800
Experimental studies of the separating confluent boundary-layer. Volume 1: Summary
[NASA-CR-3655] N83-26822
Correlation of compressive stress with spalling of plasma sprayed ceramic materials
[NASA-TM-83406] N83-27016

SHELL STABILITY
Stability of laminated composite shells subjected to uniform axial compression and torsion
[AD-A125204] N83-27262

SHELL THEORY
Bending of laminated anisotropic shells by a shear deformable finite element
[PB83-145409] N83-27278
Inner-shell ionization and stopping power N83-27704

SHELLS (STRUCTURAL FORMS)
Thermal performance of a double-envelope house
[DE82-018061] N83-27417

SHIPYARDS
Seismic response of port and harbor facilities
[PB83-145490] N83-27534

SHOCK HEATING
A general-purpose computer code for predicting chemical-kinetic behavior behind incident and reflected shocks
[DE82-015878] N83-27169

SHOCK WAVE INTERACTION
Fundamental study of dense-fluid detonation
[AD-A125300] N83-27156

SHOCK WAVES
Boundary-layer transition on blunt, slender cones at hypersonic Mach numbers N83-26794
A note on the oscillation of cavities coupled to aerodynamic flows N83-26795
Improved analytical and numerical techniques for calculating explosions and implosions N83-26801
Ignition of flamelets behind incident shock waves and the transition to detonation
[AD-A125217] N83-26939
Ultrasonic mixing of epoxy curing agents
[NASA-TM-85643] N83-27018
Oblique interactions of detonation waves with explosive/metal interfaces
[DE83-007119] N83-27038
Summary of ignition and growth modeling of shock initiation and delayed detonation in full-density and porous propellants
[DE83-007405] N83-27041
I. R. emission measurements of shocked rocket propellants by time-resolved infrared radiometry
[DE83-007356] N83-27042
Shock-wave response of titanium sunhydride-potassium perchlorate
[DE82-016739] N83-27043
Linearized stability of extreme shock profiles for systems of conservation laws with viscosity
[AD-A125256] N83-27159
A general-purpose computer code for predicting chemical-kinetic behavior behind incident and reflected shocks
[DE82-015878] N83-27169

SHORT TAKEOFF AIRCRAFT
A flight-test and simulation evaluation of the longitudinal final approach and landing performance of an automatic system for a light wing loading STOL aircraft
[NASA-TM-84270] N83-26845

SHROUDED PROPELLERS
Open water experiments on an ROV thruster --- Remotely Operated (underwater) Vehicle (ROV)
[NMI-R-143] N83-27212

SIDELOBE REDUCTION
A new technique for reducing radar response to signals entering antenna sidelobes
[AD-A125191] N83-27101

SIDELOBES
A new technique for reducing radar response to signals entering antenna sidelobes
[AD-A125191] N83-27101

SIDESLIP
Experimental investigation of the mixing of highly swirling flows
[AD-A125249] N83-27160

SIGNAL ANALYSIS
A prony methody for noisy data: Choosing the signal components and selecting the order in exponential signal models
[AD-A124897] N83-27646

SIGNAL DETECTION
The phase noise of semiconductor lasers in single mode optical fiber heterodyne systems
[ENST-E-82013] N83-27211
Equipment for recording the direction of incidence of infrasonic sound waves. Technical description
[FOA-C-30307-E1] N83-27807

SIGNAL ENCODING
The statistical properties of autosynchronizing scramblers --- data transmission
[FUB-21-1982] N83-27120
Design of an additive scrambler for parallel connection with numerical multiplexers at 565 Mb/sec --- data transmission
[FUB-22-1982] N83-27121

SIGNAL PROCESSING
Test operations procedures
[AD-A124797] N83-27092
Numerical treatment of Doppler radar signals --- airport radar, video data
[ENST-E-82014] N83-27114
Engineering Research Division publication report, calendar year 1981 --- bibliography
[DE82-016086] N83-27265

SIGNAL TO NOISE RATIOS
Test operations procedures
[AD-A124797] N83-27092
The performance of a PN spread spectrum receiver preceded by an adaptive interference suppression filter
[AD-A124903] N83-27098
Restoration of pulse position modulated signal in a high noise environment
[AD-A124902] N83-27099
Investigation of the coupling of unsteady lift to low order acoustic duct modes in an axial flow fan
[AD-A124819] N83-27796

SIGNALS
Design and simulation of a unique signal mechanism
[DE82-011568] N83-27110

SIGNATURE ANALYSIS
Conducted and radiated signatures of fluorescent lamp systems in C and I environments N83-27108

SILANES
Silanization: Chemical surface modification of solid surfaces by silane coupling agents --- for detection systems
[FOA-C40166-C2(B2/A3)] N83-26984
Laboratory tests at elevated pressures of a silane igniter system for in-situ coal gasification
[DE83-007217] N83-27450

SILICA GLASS
Quantitative analysis of phosphosilicate glass films on silicon wafers
[DE82-017642] N83-26953

SILICIDES
Processing of fused silicide coatings for carbon-based materials
[NASA-TM-83362] N83-27019

SILICON
Quantitative analysis of phosphosilicate glass films on silicon wafers
[DE82-017642] N83-26953
Melt depth and regrowth kinetics in pulsed laser annealing of silicon and gallium arsenide
[DE83-005192] N83-27205
Process research on non-CZ silicon material
[NASA-CR-172684] N83-27381
Stopping power of rare gases in amorphous silicon for MeV helium ions N83-27707

SILICON FILMS
Aluminum nitride thin film and composite bulk wave resonators
[DE82-019303] N83-27135

SILICON NITRIDES
Sintering phenomena of non-oxide silicon compounds
[DE83-007332] N83-26932
RF sputtered silicon and hafnium nitrides: Properties and adhesion to 440C stainless steel
[NASA-TM-83400] N83-27020

SILICON OXIDES
Silicon MIS/inversion-layer solar cells
[DE83-005422] N83-27453

SILVER
Fast-neutron scattering cross sections of elemental silver
[DE82-019477] N83-27883

SIMULATION
Relation of coal characteristics to liquefaction behavior. Part 2: Continuous flow reactor studies by Gulf Research and Development Co.
[DE82-016938] N83-27046
A modular system for the control of complex accelerators using portable software N83-27781

SINE WAVES
Computation of incompressible potential flow over an airfoil using a high order aerodynamic panel method based on circular arc panels
[AD-A124896] N83-26825

SINGLE CRYSTALS
Influence of temperature upon elastic limit and dislocation mobility of single-crystal HgI2
[DE82-017694] N83-27266
Ion-channelling effects in scanning ion microscopy with a Ga+ probe N83-27709
Muon spin-rotation study on magnetite
[DE82-019535] N83-27834
Experimental characterization of the flux-line lattice in superconducting V3Si
[DE83-004647] N83-27888

SINTERING
Sintering phenomena of non-oxide silicon compounds
[DE83-007332] N83-26932

SIRIO SATELLITE
Use of the VHF signal of the Sirio satellite for ionospheric investigations N83-27533

SITE SELECTION
Responses of airborne biota to microwave transmission from satellite power system
[DE83-006495] N83-27498
Meteorological tower data, Grand Junction Tailings Site, Colorado
[DE82-018919] N83-27555

SIZE (DIMENSIONS)
Evaluation and performance of closed-circuit breathing apparatus
[DE82-015877] N83-27601

SIZE DISTRIBUTION
Lithium/SO2 cathode studies
[DE82-012777] N83-27462

SKIN (ANATOMY)
Effects of sleep deprivation on thermoregulation during exercise
[AD-A124982] N83-27580

SLEEP DEPRIVATION
Effects of sleep deprivation on thermoregulation during exercise
[AD-A124982] N83-27580
Sleep deprivation depresses thermoregulatory responses to physical exercise
[AD-A125062] N83-27581

SLIP CASTING
Concrete construction using slipform techniques
[AD-A124923] N83-27059

SLOPES
Atmospheric conditions influencing slant path low visibility
[AD-A116109] N83-27847

SLURRIES
Proceedings of the 4th International Symposion on Coal-Slurry Combustion, volume 1
[DE82-016335] N83-26944
Solvent Refined Coal (SRC) process. Corrosion-erosion study
[DE82-011499] N83-26966
Proceedings of the Fourth International Symposium on Coal-Slurry Combustion, volume 3 --- conferences
[DE82-016351] N83-26982
Proceedings of the Fourth International Symposium on Coal-Slurry Combustion, volume 4
[DE82-016336] N83-26983
Processing of fused silicide coatings for carbon-based materials
[NASA-TM-83362] N83-27019
Relation of coal characteristics to liquefaction behavior. Part 2: Continuous flow reactor studies by Gulf Research and Development Co.
[DE82-016938] N83-27046

SMOKE
An investigation of the effectiveness of smoke suppressant fuel additives for turbojet applications
[AD-A125025] N83-27034

SMOOTHING
Motion estimation based on multiple local constraints and nonlinear smoothing
[AD-A124838] N83-27640
Optimal smoothing and estimation for hybrid state processes
[AD-A124907] N83-27683

SNOW
Revised Uniform Summary of Surface Weather Observations (RUSSWO)
[AD-A122719] N83-27543

SOCIAL FACTORS
Household energy conservation: Strategies for behavioral research
[RAND/N-1909-DOE] N83-27349

SOCIOLOGY
Psychological and system variables in team problem solving: Experimental studies of computer-mediated participation
[AD-A124924] N83-27596

SODIUM
Welding equipment and process development for inaccessible tube-to-tubesheet welding on a sodium-heated steam generator N83-27236
Ion-exchange behavior of alkali metals on treated carbons
[DE83-005980] N83-27835

SODIUM CHLORIDES
Deep impurities: A crystalline cluster approach
[INPE-2717-PRE/303] N83-27878

SOFTWARE TOOLS
Program visualization
[AD-A125291] N83-27621
An interactive and automated software development environment
[AD-A124872] N83-27623
Use of the C language pre-processor in the RT-11 FORTRAN environment
[DE82-010076] N83-27626
A modular system for the control of complex accelerators using portable software N83-27781
The distributed control system for the Fermilab 200 MeV Linac N83-27782

SOIL EROSION
Remote Sensing techniques used to characterize soil erosion in southwestern Sao Paulo state --- Brazil
[E83-10339] N83-27315

SOIL MAPPING
Satellite monitoring of vegetation and geology in semi-arid environments --- Tanzania
[E83-10343] N83-27318

SOIL MOISTURE
Effect of frequency-dependent soil parameters on reflection coefficients
[AD-A124798] N83-27091
Simulating soybean canopy temperature as affected by weather variables and soil water potential
[E83-10319] N83-27307
Assessing solar energy and water use efficiencies in winter wheat
[E83-10329] N83-27313
A computer program for the simulation of heat and moisture flow in soils
[E83-10342] N83-27317
The sensitivity of numerically simulated climates to land-surface boundary conditions
[NASA-TM-83985] N83-27536

SOILS
A computer program for the simulation of heat and moisture flow in soils
[E83-10342] N83-27317
Quality assurance for environmental analytical chemistry: 1981
[DE83-007102] N83-27513
User's manual for MODCAL: Bounding surface soil plasticity model calibration and prediction code, volume 2
[AD-A124867] N83-27523
Smectites versus palagonites in Mars soil: Evidence from simulations of Viking biology labeled release experiments
[NASA-TM-84361] N83-27947

SOLAR ACTIVITY
Correlating radio emissions with visible emissions from individual solar active regions
[AD-A124892] N83-27949

SOLAR ARRAYS
Safe on-orbit experiment for measurement of large structures dynamics N83-26902
SAFE II: Large systems space plasma evaluation experiment N83-26903
Electronic system for high power load control --- solar arrays
[NASA-CASE-NPO-15358-1] N83-27126
Isolation transformers for utility-interactive photovoltaic systems
[DE83-006914] N83-27140
Intermediate photovoltaic system application experiment operational performance. Executive summary for Newman Power Station, El Paso, Texas
[DE82-019965] N83-27407
Intermediate photovoltaic system application experiment operational performance. Executive summary for Oklahoma Center for Science and Arts, Oklahoma City, Oklahoma
[DE82-019964] N83-27408
Intermediate photovoltaic system application experiment operational performance. Executive summary. Volume 6: Beverly High School, Beverly, Massachusetts
[DE82-015660] N83-27409

Intermediate photovoltaic system application experiment operational performance. Executive summary for Beverly High School, Beverly, Massachusetts
[DE82-019967] N83-27410
Intermediate photovoltaic system application experiment operational performance. Executive summary for CDC Light Manufacturing Building, San Bernardino, California
[DE82-019962] N83-27411
Intermediate photovoltaic system application experiment operational performance. Executive summary for Mississippi County Community College, Blytheville, Arkansas
[DE82-019966] N83-27412
Solar project description: South Bridge Towers no. 6 multi-family cooperative, New York City, New York
[DE82-019252] N83-27421
Optimized low-cost-array field designs for photovoltaic systems
[DE82-013640] N83-27435
Flywheel energy-storage-and-conversion system for photovoltaic applications
[DE82-017128] N83-27437
Experimental results of pitching moment tests on parabolic-trough solar-collector array configurations
[DE83-006027] N83-27446

SOLAR CELLS
Concentration solar-cell flash tester
[DE82-018551] N83-27195
The simulation of a passive solar energy system
[AD-A124900] N83-27354
Process research on non-CZ silicon material
[NASA-CR-172684] N83-27381
Low-cost, sprayed CdTe solar-cell research
[DE83-007275] N83-27392
Evaporated lithium-doped amorphous silicon solar cells
[DE82-018078] N83-27400
Intermediate photovoltaic system application experiment operational performance. Executive summary for Newman Power Station, El Paso, Texas
[DE82-019965] N83-27407
Intermediate photovoltaic system application experiment operational performance. Executive summary for Oklahoma Center for Science and Arts, Oklahoma City, Oklahoma
[DE82-019964] N83-27408
Intermediate photovoltaic system application experiment operational performance. Executive summary. Volume 6: Beverly High School, Beverly, Massachusetts
[DE82-015660] N83-27409
Intermediate photovoltaic system application experiment operational performance. Executive summary for Beverly High School, Beverly, Massachusetts
[DE82-019967] N83-27410
Intermediate photovoltaic system application experiment operational performance. Executive summary for CDC Light Manufacturing Building, San Bernardino, California
[DE82-019962] N83-27411
Intermediate photovoltaic system application experiment operational performance. Executive summary for Mississippi County Community College, Blytheville, Arkansas
[DE82-019966] N83-27412
Development and application of fully-automated EBIC techniques for solar-cell measurements
[DE82-014409] N83-27415
Development of copper sulfide/cadmium thin-film solar cells
[DE82-014308] N83-27416
Design and development of a high-concentration photovoltaic concentration (2-d)
[DE82-008924] N83-27433
Intermediate photovoltaic system application experiment operational performance report, for April 1982. Volume 2: For Mississippi County Community College, Blytheville, Arkansas
[DE83-006446] N83-27439
Intermediate photovoltaic system application experiment operational performance report, for September 1982. Volume 5: For Oklahoma Center for Science and Arts
[DE83-006448] N83-27440
Intermediate photovoltaic system application experiment operational performance report, for October 1982. Volume 16: For Lovington Square Shopping Center, Lovington, New Mexico
[DE83-006447] N83-27441
Intermediate photovoltaic system application experiment operational performance report. Volume 16: For Newman Power Station, El Paso, Texas for October 1982
[DE83-006445] N83-27442
Cadmium sulfide/copper ternary heterojunction cell research
[DE83-000997] N83-27451
Silicon MIS/inversion-layer solar cells
[DE83-005422] N83-27453
Growth and characterization of Czochralski-grown n and p-type GaAs for space solar cell substrates
[NASA-CR-168099] N83-27877

SOLAR COLLECTORS
Transparent heat-mirror materials and deposition technology
[DE83-007042] N83-27357
Durable innovative solar optical materials: The international challenge N83-27358
Low emissivity and solar control coatings on architectural glass N83-27359
Materials for transparent heat mirror coatings N83-27360
Optical properties of transparent heat mirrors based on thin films of TiN, ZrN, and HfN N83-27361
Heat mirrors on plastic sheet using transparent oxide conducting coatings N83-27364
Performance and sputtering criteria of modern architectural glass coatings N83-27366
Conceptual design of the Truscott Brine Lake solar pond system. Volume 2: Utility-integrated scenario
[DE83-008133] N83-27386
Solar project description: South Bridge Towers no. 6 multi-family cooperative, New York City, New York
[DE82-019252] N83-27421
IEA small solar-power-system project, operation status
[DE82-020001] N83-27423
Design and development of a high-concentration photovoltaic concentration (2-d)
[DE82-008924] N83-27433
Collector trade-off study for BDM PRDA-35 application
[DE82-013532] N83-27434
Analysis, design, fabrication, and testing of moderately concentrating solar-energy collectors
[DE83-006065] N83-27445
Experimental results of pitching moment tests on parabolic-trough solar-collector array configurations
[DE83-006027] N83-27446
Assessment of water use impacts from solar-energy development
[DE83-004888] N83-27448
Intermediate photovoltaic system application experiment operational performance report for G. N. Wilcox Hospital, Kaua, Hawaii for September 1982, volume 5
[DE83-006843] N83-27454
How to solve materials and design problems in solar heating and cooling, Energy Technology Review No. 77
[DE83-006116] N83-27456
Solar-assisted water-source heat pump
[DE83-006023] N83-27457
Concentrated solar-flux measurements at the IEA-SSPS solar-central-receiver power plant, Tabernas - Lameria (Spain)
[DE82-020000] N83-27528

SOLAR COOLING
Solar-energy-system performance evaluation. San Anselmo School, San Jose, California, April 1981-March 1982
[DE82-020142] N83-27422

SOLAR ENERGY
The simulation of a passive solar energy system
[AD-A124900] N83-27354
Engineering analysis of potential photosynthetic bacterial hydrogen-production systems
[DE82-019151] N83-27414
City of Tucson solar code
[DE82-016788] N83-27418
Validation of passive-solar analysis/design tools using class A performance-evaluation data
[DE82-017588] N83-27420
Biomass-energy-technology program summary
[DE82-018926] N83-27426
Collector trade-off study for BDM PRDA-35 application
[DE82-013532] N83-27434
Assessment of water use impacts from solar-energy development
[DE83-004888] N83-27448
Energy future Santa Cruz. A citizens plan for energy self-reliance: Executive summary
[PB83-136978] N83-27474

SOLAR ENERGY CONVERSION
Thermochemical processes for solar hydrogen production
[DE82-019575] N83-27047
Isolation transformers for utility-interactive photovoltaic systems
[DE83-006914] N83-27140
Intermediate photovoltaic system application experiment operational performance. Executive summary for Oklahoma Center for Science and Arts, Oklahoma City, Oklahoma
[DE82-019964] N83-27408
Intermediate photovoltaic system application experiment operational performance. Executive summary. Volume 6: Beverly High School, Beverly, Massachusetts
[DE82-015660] N83-27409
Intermediate photovoltaic system application experiment operational performance. Executive summary for CDC Light Manufacturing Building, San Bernardino, California
[DE82-019962] N83-27411
Intermediate photovoltaic system application experiment operational performance. Executive summary for Mississippi County Community College, Blytheville, Arkansas
[DE82-019966] N83-27412
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984 N83-27919

SOLAR FLUX
Concentrated solar-flux measurements at the IEA-SSPS solar-central-receiver power plant, Tabernas - Lameria (Spain)
[DE82-020000] N83-27528

SOLAR GENERATORS
IEA small solar-power-system project, operation status
[DE82-020001] N83-27423
Concentrated solar-flux measurements at the IEA-SSPS solar-central-receiver power plant, Tabernas - Lameria (Spain)
[DE82-020000] N83-27528

SOLAR HEATING
Frequency-domain approach to passive building energy analysis
[DE82-019164] N83-27063
Economic analysis of the integrated heating and cooling potential of a residential passive-solar water wall design
[DE82-018372] N83-27419
Solar project description: South Bridge Towers no. 6 multi-family cooperative, New York City, New York
[DE82-019252] N83-27421
Solar-energy-system performance evaluation. San Anselmo School, San Jose, California, April 1981-March 1982
[DE82-020142] N83-27422
An overview of the Solar in Federal Buildings Demonstration Program (SFBP)
[DE83-005757] N83-27452
Analysis of field-test data from domestic solar-water heaters in the southern United States
[DE83-006822] N83-27455
How to solve materials and design problems in solar heating and cooling, Energy Technology Review No. 77
[DE83-006116] N83-27456

SOLAR PONDS (HEAT STORAGE)
Conceptual design of the Truscott Brine Lake solar pond system. Volume 2: Utility-integrated scenario
[DE83-008133] N83-27386
Engineering analysis of potential photosynthetic bacterial hydrogen-production systems
[DE82-019151] N83-27414

SOLAR POSITION
Effect of scene illumination conditions on digital enhancement techniques of multispectral scanner LANDSAT images
[E83-10344] N83-27319

SOLAR POWER SATELLITES
Responses of airborne biota to microwave transmission from satellite power system
[DE83-006495] N83-27498

SOLAR RADIO BURSTS
Persistent 1.5s oscillations superimposed at a solar burst observed at two mm-wavelengths
[INPE-2737-PRE/317] N83-27948

SOLAR REFLECTORS
High quality transparent heat reflectors of reactively evaporated indium tin oxide N83-27363

SOLENOIDS
Experimental studies of electron beam focusing with solenoid lenses near the space charge limit N83-27772

SOLID PROPELLANT IGNITION
Summary of ignition and growth modeling of shock initiation and delayed detonation in full-density and porous propellants
[DE83-007405] N83-27041

SOLID PROPELLANT ROCKET ENGINES
Integrated aerodynamic tests of the space shuttle vehicle during solid rocket booster separation at Mach 4.5 (IA193)
[AD-A125297] N83-26915

SOLID ROCKET PROPELLANTS
Analytical design for internal burning star grains of solid rockets
[AD-A124826] N83-27032

SOLID SUSPENSIONS
Particle resuspension and translocation N83-27496

SOLID WASTES
Waste-to-energy compendium: Revised 1982 edition
[DE82-020328] N83-27471
Pacific Northwest Laboratory report to the DOE Office of Energy Research. Part 2: Environmental sciences
[DE83-007586] N83-27481

SOLIDIFICATION
Dynamic powder compaction of rapidly solidified Path A alloy with increased carbon and titanium content
[DE82-017252] N83-27008
Melt depth and regrowth kinetics in pulsed laser annealing of silicon and gallium arsenide
[DE83-005192] N83-27205
Figure-of-merit analysis and cost effectiveness of low-level radioactive waste treatment systems
[DE82-018890] N83-27838

SOLIDIFIED GASES
Experiments with phase transitions at very high pressure — compressed solidified gases, semiconductors, superconductors, and molecular crystals
[NASA-CR-3696] N83-27879

SOLIDS
Fundamental study of dense-fluid detonation
[AD-A125300] N83-27156
Empirical stopping powers for ions in solids N83-27706
Ion-channeling effects in scanning ion microscopy with a Ga+ probe N83-27709
Properties of three-dimensional energetic solids and molecular crystals
[AD-A124944] N83-27880

SOLUBILITY
Efficiency of buffered aqueous carboxylic acid solutions and organic solvents to absorb SO2 from industrial flue; solubility data from gas-liquid chromatography
[DE83-005405] N83-27510

SOLUTIONS
Molecular dynamics of chemical reactions in solution
[AD-A124953] N83-26941

SOLVENT REFINED COAL
Solvent Refined Coal (SRC) process. Corrosion-erosion study
[DE82-011499] N83-26966
Thermophysical properties of coal liquids
[DE82-013366] N83-26967
Relation of coal characteristics to liquefaction behavior. Part 2: Continuous flow reactor studies by Gulf Research and Development Co.
[DE82-016938] N83-27046

SOLVENTS
A study of solvent and aqueous cleaning of fluxes
[AD-A124950] N83-26994
Organic solvent regeneration of granular activated carbon
[PB83-150201] N83-27078

SOOT
Synthetic-fuel combustion: Pollutant formation. Scot-initiation mechanisms in burning aromatics
[DE83-005611] N83-26945
Soot formation in synthetic-fuel droplets
[DE82-018420] N83-26958

SOUND FIELDS
Investigation of the coupling of unsteady lift to low order acoustic duct modes in an axial flow fan
[AD-A124819] N83-27796

SOUND PRESSURE
Analysis of STS-3 Get Away Special (GAS) flight data and vibration specification for gas payloads
[NASA-TM-85000] N83-26911

SOUND TRANSDUCERS
Sandia Helicopter Acoustic Detector (SHAD)
[DE82-018925] N83-27803
Equipment for recording the direction of incidence of infrasonic sound waves. Technical description
[FOA-C-30307-E1] N83-27807

SOUND TRANSMISSION
Satellite applications to acoustic prediction systems
[AD-A125027] N83-27564
Sensitivity to sound speed of surface/bottom reflecting transmissions in a deep ocean channel
[AD-A125278] N83-27800

SOUND WAVES
Computerized measuremont and tracking of acoustical resonances
[AD-A125286] N83-27799
Equipment for recording the direction of incidence of infrasonic sound waves. Technical description
[FOA-C-30307-E1] N83-27807

SOUTH DAKOTA
Composition and assembly of a spectral and agronomic data base for 1980 spring small grain segments
[E83-10311] N83-27301

SOUTHERN HEMISPHERE
SouthErn Hemisphere application of the Navy nested tropical cyclone model
[AD-A125011] N83-27545

SOYBEANS
Simulating soybean canopy temperature as affected by weather variables and soil water potential
[E83-10319] N83-27307
Research and development of LANDSAT-based crop inventory techniques
[E83-10359] N83-27325

SPACE CHARGE
Octupole focusing in transport and acceleration systems N83-27731
Experimental studies of electron beam focusing with solenoid lenses near the space charge limit N83-27772
Ion source development and injector design for Zebra N83-27776
Modeling beam-front dynamics at low gas pressures
[DE82-016636] N83-27842

SPACE COOLING (BUILDINGS)
Phase 2 Brayton/Rankine 10-ton gas-fired space-conditioning system
[DE82-016367] N83-27355
Solar-energy-system performance evaluation. San Anselmo School, San Jose, California, April 1981-March 1982
[DE82-020142] N83-27422

SPACE ERECTABLE STRUCTURES
Development of deployable structures for large space platform systems, volume 1
[NASA-CR-170689] N83-26919

SPACE HEATING (BUILDINGS)
Frequency-domain approach to passive building energy analysis
[DE82-019164] N83-27063
Solar-energy-system performance evaluation. San Anselmo School, San Jose, California, April 1981-March 1982
[DE82-020142] N83-27422
Intermediate photovoltaic system application experiment operational performance report, for April 1982. Volume 2: For Mississippi County Community College, Blytheville, Arkansas
[DE83-006446] N83-27439
Intermediate photovoltaic system application experiment operational performance report, for September 1982. Volume 5: For Oklahoma Center for Science and Arts
[DE83-006448] N83-27440
Intermediate photovoltaic system application experiment operational performance report, for October 1982. Volume 16: For Lovington Square Shopping Center, Lovington, New Mexico
[DE83-006447] N83-27441
Intermediate photovoltaic system application experiment operational performance report. Volume 16: For Newman Power Station, El Paso, Texas for October 1982
[DE83-006445] N83-27442
An overview of the Solar in Federal Buildings Demonstration Program (SFBP)
[DE83-005757] N83-27452
Economic evaluation of end-user conservation measures applied to buildings served by a proposed district-heating system
[DE82-016080] N83-27470
Application of computer modeling to the study of the thermodynamic forces acting on a building
[AD-A125227] N83-27894

SPACE MAINTENANCE
Definition of technology development missions for early space station satellite servicing, volume 1
[NASA-CR-170786] N83-26850
Definition of technology development missions for early space station satellite servicing, volume 2
[NASA-CR-170787] N83-26851
Technology needs for Air Force autonomous spacecraft
[NASA-CR-172677] N83-26921

SPACE MANUFACTURING
SADE: A space experiment to demonstrate structural assembly N83-26906

SPACE PLASMAS
SAFE II: Large systems space plasma evaluation experiment N83-26903

SPACE PLATFORMS
Space Technology Experiment Platform (STEP). A Shuttle-borne support facility for structures, structural dynamics, and control technology flight experiments N83-26901
Development of deployable structures for large space platform systems, volume 1
[NASA-CR-170689] N83-26919
Auxiliary propulsion requirements for large space systems
[NASA-TM-83388] N83-26922

SPACE POWER REACTORS
Space reactors
[DE82-019187] N83-27837

SPACE SHUTTLE ORBITERS
Space flight experience with the Shuttle Orbiter control system N83-26900
Heating measurements on Space Shuttle Orbiter models with differentially deflected elevons
[NASA-TM-84646] N83-27151
Heat transfer/boundary layer investigation of heating discrepancies in wind tunnel testing of orbiter insulating articles
[AD-A124803] N83-27893

SPACE SHUTTLE PAYLOADS
Satellite systems requirements for land mobile communications N83-26856
Evaluation of mounting bolt loads for Space Shuttle Get Away Special (GAS) adapter beam
[NASA-TM-84988] N83-26910
Analysis of STS-3 Get Away Special (GAS) flight data and vibration specification for gas payloads
[NASA-TM-85000] N83-26911
A procedure for combining acoustically induced and mechanically induced loads (first passage failure design criterion)
[NASA-CR-166824] N83-27795

SPACE SHUTTLES
SADE: A space experiment to demonstrate structural assembly N83-26906
Optimizing the space transportation system
[AD-A124920] N83-26913
Integrated aerodynamic tests of the space shuttle vehicle during solid rocket booster separation at Mach 4.5 (IA193)
[AD-A125297] N83-26915

SPACE STATIONS
Definition of technology development missions for early space station satellite servicing, volume 1
[NASA-CR-170786] N83-26850
Definition of technology development missions for early space station satellite servicing, volume 2
[NASA-CR-170787] N83-26851
Optimizing the space transportation system
[AD-A124920] N83-26913
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984: National Aeronautics and Space Administration N83-27920

SPACE TRANSPORTATION SYSTEM
Space Technology Experiment Platform (STEP). A Shuttle-borne support facility for structures, structural dynamics, and control technology flight experiments N83-26901
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984 N83-27919
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984: National Aeronautics and Space Administration N83-27920

SPACE TRANSPORTATION SYSTEM 2 FLIGHT
Body flap heat transfer data from space shuttle orbiter entry flight test maneuvers
[AD-A124844] N83-26914

SPACE TRANSPORTATION SYSTEM 7 FLIGHT
Ambitious STS-7 mission to feature first landing at Kennedy
[NASA-NEWS-RELEASE-83-87] N83-26912

SPACEBORNE ASTRONOMY
Large deployable reflector: An infrared and submillimeter orbiting observatory N83-26858

SPACEBORNE EXPERIMENTS
Space Technology Experiment Platform (STEP). A Shuttle-borne support facility for structures, structural dynamics, and control technology flight experiments N83-26901

SPACEBORNE TELESCOPES
Survey of deployable antenna concepts N83-26872

SPACECRAFT
High frequency, high power capacitor development
[NASA-CR-168035] N83-27127

SPACECRAFT ANTENNAS
Wrap-rib antenna concept development overview N83-26873
Hoop/column antenna development program N83-26874
Large Space Antenna Systems Technology, part 2
[NASA-CP-2269-PT-2] N83-26879
Control of large space antennas N83-26880
Enabling technologies for large precision space systems N83-26881
Current status of system identification methodology N83-26883
Computer analysis and ground testing of large space systems control strategies N83-26884
Shape determination/identification for large space antennas N83-26885
Scanning beam antenna conceptual design for 20/30 GHz satellite systems N83-26889
Multimission advanced configuration N83-26890
The need for space flight experiments and testing in the development of large space antenna systems technology N83-26898
A large antenna system flight experiment N83-26905

SPACECRAFT COMMUNICATION
Performance of sequentially decoded long constraint length codes for a satellite communications link in a scintillated channel
[AD-A124814] N83-27093
LANDSAT-4 to ground station interface description
[E83-10292] N83-27291
SPACECRAFT COMPONENTS
Spacecraft material applications: Long-term stability questions N83-26867
SPACECRAFT CONFIGURATIONS
MAST space research flight experiment N83-26904
Integrated aerodynamic tests of the space shuttle vehicle during solid rocket booster separation at Mach 4.5 (IA193)
[AD-A125297] N83-26915
Development of deployable structures for large space platform systems, volume 1
[NASA-CR-170669] N83-26919
SPACECRAFT CONSTRUCTION MATERIALS
Spacecraft materials research: A NASA perspective N83-26866
Spacecraft material applications: Long-term stability questions N83-26867
SPACECRAFT CONTROL
Enabling technologies for large precision space systems N83-26881
Reduced order control design for large space structures: A communication satellite example N83-26882
Computer analysis and ground testing of large space systems control strategies N83-26884
Practical approaches to the design of control systems for large space structures N83-26886
A robot in space as a large space structures control experiment N83-26899
Space Technology Experiment Platform (STEP). A Shuttle-borne support facility for structures, structural dynamics, and control technology flight experiments N83-26901
MAST space research flight experiment N83-26904
A large antenna system flight experiment N83-26905
SADE: A space experiment to demonstrate structural assembly N83-26906
Technology needs for Air Force autonomous spacecraft
[NASA-CR-172677] N83-26921
SPACECRAFT DESIGN
Earth observation system: Spacecraft design N83-26861
MAST space research flight experiment N83-26904
A large antenna system flight experiment N83-26905
Technology needs for Air Force autonomous spacecraft
[NASA-CR-172677] N83-26921
SPACECRAFT LAUNCHING
Evaluation of mounting bolt loads for Space Shuttle Get Away Special (GAS) adapter beam
[NASA-TM-84988] N83-26910
SPACECRAFT POWER SUPPLIES
Evaluation program for secondary spacecraft cells. Cycle life test
[NASA-CR-172679] N83-27351
Evaluation program for secondary spacecraft cells. Cycle life test
[NASA-CR-172680] N83-27352
SPACECRAFT PROPULSION
The performance and application of high speed long life LH2 hybrid bearings for reusable rocket engine turbomachinery
[NASA-TM-84317] N83-26923
Advanced propulsion concepts for orbital transfer vehicles
[NASA-TM-83419] N83-26924
SPACELAB PAYLOADS
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984: National Aeronautics and Space Administration N83-27920
SPACETENNAS
Survey of deployable antenna concepts N83-26872
Wrap-rib antenna concept development overview N83-26873
Hoop/column antenna development program N83-26874
Status of deployable geo-truss development N83-26875
Inflated antennas N83-26877
Electrostatically figured membrane reflectors: An overview N83-26878
SPAIN
Concentrated solar-flux measurements at the IEA-SSPS solar-central-receiver power plant, Tabernas - Lameria (Spain)
[DE82-020000] N83-27528
SPALLATION
The linear accelerator for the proposed German spallation source N83-27728
Dead beat filling and feedforward RF control for the spallation neutron source SNQ N83-27733
Preaccelerator design and component development for the SNQ linear accelerator N83-27734
Beam dynamics studies of high current RFQ and DTL tanks N83-27756
SPARK GAPS
Low-cost megawatt RF power sources for linear accelerators to 70MHz and above
[LBL-13024] N83-27784
SPARK IGNITION
Representations of combustion in computer models of spark ignition
[CFD/82/18] N83-26986
Assessment of water addition to spark ignition engines
[DE83-006013] N83-27245
SPATIAL DISTRIBUTION
Evaluation of ground cover and land use in the PDRI-AM remote sensing technique program area — Brazil
[E83-10230] N83-27283
Monitoring tropical vegetation succession with LANDSAT data
[E83-10306] N83-27296
Geologic mapping of the Bauru Group in Sao Paulo state by LANDSAT images — Brazil
[E83-10341] N83-27316
SPATIAL RESOLUTION
Contour-based motion estimation
[AD-A124812] N83-27848
SPECIFIC HEAT
The numerical solution of pressure oscillations in an open cavity N83-26793
Thermodynamics of organic compounds
[AD-A125022] N83-27895
SPECIFIC IMPULSE
Boron-containing fuel-rich HTBP propellants. Manufacturing, burning experiments and specific impulse calculations
[FOA-C-20483-D1] N83-27055
SPECIFICATIONS
A summary of mission and system performance requirements for large space antennas N83-26865
Creep characteristics of butt welded joints for thick 2 1/4Cr-1Mo pipework and pressure vessels N83-27233
Waste-to-energy compendium: Revised 1982 edition
[DE82-020328] N83-27471
SPECTRA
Kahuku kite wind study. 2: Kahuku foothills
[DE83-006402] N83-27554
SPECTRAL BANDS
Selecting band combinations with thematic mapper data
[E83-10303] N83-27294
Study of LANDSAT-D thematic mapper performance as applied to hydrocarbon exploration — Southern Ontario, Lawton, Oklahoma; Owl Creek, Wyoming; Washington, D.C.; and Death Valley California
[E83-10325] N83-27310
SPECTRAL REFLECTANCE
Composition and assembly of a spectral and agronomic data base for 1980 spring small grain segments
[E83-10311] N83-27301
SPECTRAL RESOLUTION
Study to assess the importance of errors introduced by applying NOAA 6 and NOAA 7 AVHRR data as an estimator of vegetative vigor: Feasibility study of data normalization
[E83-10346] N83-27321
Study on spectral/radiometric characteristics of the thematic mapper for land use applications
[E83-10348] N83-27323
SPECTRAL SENSITIVITY
LANDSAT 4 investigations of thematic mapper and multispectral scanner applications
[E83-10301] N83-27292
SPECTRAL SIGNATURES
Development of techniques for producing static strata maps and development of photointerpretive methods based on multitemporal LANDSAT data
[E83-10081] N83-27284
The classification of LANDSAT data for the Orlando, Florida, urban fringe area
[E83-10327] N83-27311
Effect of scene illumination conditions on digital enhancement techniques of multispectral scanner LANDSAT images
[E83-10344] N83-27319
Research and development of LANDSAT-based crop inventory techniques
[E83-10359] N83-27325
Energetic-ion acceleration and transport in the upstream region of Jupiter: Voyager 1 and 2
[NASA-TM-85179] N83-27946
SPECTROMETERS
Heavy-ion-spectrometer system --- operation safety procedures
[DE82-017049] N83-27190
SPECTROSCOPIC ANALYSIS
Flame optimization for the spectroscopic analysis of the chemiluminescence from lead oxide
[AD-A124825] N83-26937
SPECTROSCOPY
Thermal Desorption Spectroscopy (TDS) of hydrogen from niobium
[DE82-012024] N83-26981
SPECTRUM ANALYSIS
Development of improved analytical models for mesh reflector surfaces N83-26895
Spectral analysis with an exponential window iterative method: The performance of the signal frequency evaluation — voice signal processing
[FUB-15-1982] N83-27116
Frequency charts using an iterative signal processing method — voice signal processing
[FUB-16-1982] N83-27117
Beer's-law-based, simple spectral model for direct normal and diffuse horizontal irradiance
[DE83-008132] N83-27526
Stopping power of rare gases in amorphous silicon for MeV helium ions N83-27707
Ultrasonic wave attenuation spectra in steels
[AERE-R-10753] N83-27808
SPEECH RECOGNITION
Towards very large vocabulary word recognition
[AD-A125224] N83-27094
Analysis of representative parameters grouping for the evaluation of voice signal automatic speaker recognition methods
[FUB-14-1982] N83-27115
Speech intelligibility in closed large scale environments
[FUB-24-1982] N83-27123
S-C-R compatibility and dual task performance in two complex information processing tasks: Threat evaluation and fault diagnosis
[AD-A124340] N83-27589
SPEED REGULATORS
Wind-systems technical notes: 1981
[DE83-007202] N83-27384
SPHEROMAKS
Stability and confinement of spheromaks and field-reversed configurations
[DE82-018378] N83-27862
Compact toroid experiments: Spheromaks and field-reversed configurations
[DE82-015882] N83-27865
SPIN DYNAMICS
The Gamow-Teller strength functions and neutrino problems
[DE82-018357] N83-27826
SPIN-LATTICE RELAXATION
An NMR study of hydrogen diffusion in metal hydrides containing parametric impurities
[DE83-004859] N83-27890
SPINEL
Slow crack growth in spinel in water
[NASA-TM-85644] N83-27017
SPLINE FUNCTIONS
On the relationship between functions with the same optimal knots in spline with piecewise polynomial approximation
[AD-A125002] N83-27662
SPOT (FRENCH SATELLITE)
Mapping from space and the SPOT project N83-27477
SPRAYING
Spray combustion of synthetic fuels. Phase 2: Spray-combustion phenomena
[DE82-015489] N83-26970
SPREADING
Beam broadening in a strongly scattering target in the analytical electron microscope
[DE82-014085] N83-27825
SPUTTERING
RF sputtered silicon and hafnium nitrides: Properties and adhesion to 440C stainless steel
[NASA-TM-83400] N83-27020
Anode phenomena in vacuum arcs
[DE83-007181] N83-27141
Production techniques for high volume sputtered films N83-27367
SQUARE WAVES
A note on adaptive wind tunnels with imperfect control N83-26792
STABILITY
On Synge's criterion for the stability of plane Couette flow N83-26802

Finite element approximation of the nonstationary Navier-Stokes problem. Part 2: Stability of solutions and error estimates uniform in time
[PREPRINT-558-PT-2] N83-27179
Mathematical modeling of black-and-white chromogenic image stability
[AD-A125248] N83-27186
Fluidelastic instability in shell and tube heat exchangers: A framework for a prediction method
[DE83-007812] N83-27264
Geotechnical factors and guidelines for storage of compressed air in solution-mined salt cavities
[DE82-017611] N83-27465
The stability of one-step schemes for first-order two-point boundary value problems
[AD-A125240] N83-27659
Post coupler studies for Alvarez tanks to be used for high power or variable energy N83-27763

STACKS
An investigation of the effectiveness of smoke suppressant fuel additives for turbojet applications
[AD-A125025] N83-27034

STAGNATION POINT
Calculation of boundary layers near the stagnation point of an oscillating airfoil
[NASA-TM-84305] N83-27148

STAINLESS STEELS
Use of microhardness to determine the strengthening and microstructural alterations of 14-MeV-neutron-irradiated metals
[DE82-014002] N83-27000
A statistical approach to the study of localized corrosion
[AERE-R-10832] N83-27014
RF sputtered silicon and hafnium nitrides: Properties and adhesion to 440C stainless steel
[NASA-TM-83400] N83-27020
Weld penetration variation in GTA welding of some 304 L stainless steels N83-27222
Creep rupture and creep crack growth behaviour of transition joints N83-27237
Dissimilar weld failure analysis and development program N83-27239

STANDARD DEVIATION
Analysis of ANSI N13.11: The performance algorithm
[DE82-019212] N83-27628

STANDARDIZATION
Intercomparison of water triple point cells and standard platinum resistance thermometers
[DE83-005971] N83-27196
Ultrasonic system characterization
[DE82-019210] N83-27804

STANDARDS
Concepts for a Standard Data Interchange Structure (SDIS) INPE proposal to CCSDS/Panel 3
[INPE-2724-PRE/308] N83-27087
Switching devices
[AD-A124801] N83-27129
Calibration and related measurement service of the National Bureau of Standards
[PB83-151662] N83-27199
Quality assurance for environmental analytical chemistry: 1981
[DE83-007102] N83-27513
Function of adreno-pituitary system in various regimes of effect of alternating magnetic field of industrial frequency N83-27576

STANDING WAVES
Variable energy standing wave linear accelerator structure N83-27765
Investigation of the coupling of unsteady lift to low order acoustic duct modes in an axial flow fan
[AD-A124819] N83-27796

STATIC LOADS
Rolling-element bearings
[NASA-RP-1105] N83-27214

STATIC PRESSURE
Experimental study of strength and existance domain of ground-to-air inlet vortices by ground board static pressure measurements
[PB83-144865] N83-26843

STATISTICAL ANALYSIS
Statistical experimental designs in computer aided optimal aircraft design N83-26812
Statistical review of counting accelerometer data for Navy and Marine fleet aircraft
[AD-A124966] N83-26834
A statistical approach to the study of localized corrosion
[AERE-R-10832] N83-27014
The possible modifications of the HISSE model for pure LANDSAT agricultural data
[E83-10305] N83-27295
Improved version of the split routine for CLASSY
[E83-10308] N83-27298
Assembly language coding for CLASSY
[E83-10309] N83-27299
Cross correlation analysis to determine the environmental parameters correlated with electro-optical system performance
[AD-A124886] N83-27544
Conditional permutation tests and the propensity score in observational studies
[AD-A125241] N83-27658
A procedure for combining acoustically induced and mechanically induced loads (first passage failure design criterion)
[NASA-CR-166824] N83-27795

STATISTICAL CORRELATION
Correlating radio emissions with visible emissions from individual solar active regions
[AD-A124892] N83-27949

STATISTICAL DISTRIBUTIONS
Composite beams from a statistical point of view
[TULEA-1982-05-T] N83-27273
Existence of unbiased covariance components estimators
[AD-A125299] N83-27650
A modified Kolmogorov-Smirnov, Anderson-Darling, and Cramer-Von Mises test for the gamma distribution with unknown location and scale parameters
[AD-A124841] N83-27678
Existence and convergence of random set distributions
[CTH-MATH-1983-3] N83-27691
Statistical treatment of misalignments in linear accelerators N83-27757

STATISTICAL TESTS
A new goodness of fit test for the uniform distribution with unspecified parameters
[AD-A124835] N83-27680

STATORS
Experimental investigation of the mixing of highly swirling flows
[AD-A125249] N83-27160

STEADY FLOW
On steady vortex flow in two dimensions, 1
[AD-A120965] N83-27162
On steady vortex flow in two dimensions, 2
[AD-A120966] N83-27163

STEADY STATE
A method for determining liquid volatility at ambient temperatures using an infrared gas analyzer
[AD-A124906] N83-26940
Ammonia-air fuel cell power plant systems analysis
[DE82-018914:] N83-27464

STEAM
Welding equipment and process development for inaccessible tube-to-tubesheet welding on a sodium-heated steam generator N83-27236
Geothermal steam separator evaluation (RP1672-1) N83-27377
Project DEEP STEAM
[DE82-016394] N83-27389
Downhole steam-generator study. Volume 1: Conception and feasibility evaluation
[DE82-018348] N83-27424
Efficiency of buffered aqueous carboxylic acid solutions and organic solvents to absorb SO2 from industrial flue; solubility data from gas-liquid chromatography
[DE83-005405] N83-27510

STEAM FLOW
Downhole steam-generator study. Volume 1: Conception and feasibility evaluation
[DE82-018348] N83-27424

STEEL STRUCTURES
Moment-rotation characteristics of semi-rigid steel beam-column connections
[PB83-145318] N83-27081
Electron beam welding for heavy section steel plates N83-27229

STEELS
Assessment of the quality of bearing steel from its inclusion content
[BLL-M-26906-(5828.4)] N83-26991
Passive films, surface structure and stress corrosion and crevice corrosion susceptibility
[AD-A124879] N83-26995
A new class of steels for thick-wall pressure vessels
[DE83-004101] N83-26999
Powder forging of compound steels, part 1
[TULEA-1982-16-PT-1] N83-27012
Creep deformation and crack growth in a low alloy steel welded pressure vessel containing defects N83-27225
Electron beam welding for heavy section steel plates N83-27229
Crack layer morphology and toughness characterization in steels
[NASA-CR-168154] N83-27256
Ultrasonic wave attenuation spectra in steels
[AERE-R-10753] N83-27808

STEERING
Automatic beam-steering of the Mainz Microtron N83-27775

STELLAR MAGNETIC FIELDS
Comparison of photon-photon and photon-magnetic field pair production rates N83-27930
Pair production and annihilation in strong magnetic fields N83-27931
Pair production near threshold in pulsar magnetic fields N83-27934

STELLAR MASS
Bump masses for BL Her stars
[DE83-019564] N83-27943

STELLAR RADIATION
NASA/Goddard Space Flight Center contributions to the Workshop on Positron-Electron Pairs in Astrophysics
[NASA-TM-85027] N83-27928
Pair production and annihilation in strong magnetic fields N83-27931

STELLAR TEMPERATURE
Bump masses for BL Her stars
[DE83-019564] N83-27943

STEREOSCOPY
The role of convergence in stereoscopic depth constancy
[AD-A124231] N83-27590

STIFFNESS
Spacecraft materials research: A NASA perspective N83-26866
Advances in structural concepts N83-26868

STIMULI
S-C-R compatibility and dual task performance in two complex information processing tasks: Threat evaluation and fault diagnosis
[AD-A124340] N83-27589

STIRLING CYCLE
Test results and description of a 1-kW free-piston Stirling engine with a dashpot load
[NASA-TM-83407] N83-27346
DOE/NASA Automotive Stirling Engine Project overview '83
[NASA-TM-83405] N83-27924
Automotive Stirling Engine Development Program
[NASA-CR-168074] N83-27925

STOCHASTIC PROCESSES
Investigation of a third order baro-damped verticle channel of INS
[AD-A124882] N83-26828
A statistical approach to the study of localized corrosion
[AERE-R-10832] N83-27014
Traveling-wave tube amplifier characteristics study for stochastic beam-cooling experiments
[DE83-005867] N83-27132
Multiple model adaptive estimation for space-time point process observations
[AD-A124827] N83-27641
Identifiability and estimation in random translations of marked point processes
[AD-A125313] N83-27652
Periodic renewal theory
[CTH-MATH-1983-5] N83-27675
Optimal decentralized control of finite nondeterministic systems
[AD-A124940] N83-27684
Sufficient statistics for decentralized estimation
[AD-A124941] N83-27689

STOICHIOMETRY
Effects of hydrazine and pH on the corrosion of copper-alloy materials in AVT environments with oxygen
[DE83-901124] N83-27004

STOKES FLOW
A class of biharmonic end-striping problems arising in elasticity and Stokes flow
[AD-A125305] N83-27653

STOPPING
Stopping powers of Zr, Pd, Cd, In and Pb for 6.5 MeV protons and mean excitation energies N83-27698

STOPPING POWER
Charge States and Dynamic Screening of Swift Ions in Solids
[DE83-006799] N83-27697
Geometrical effect on stopping power measurement (angle dependent energy loss) of 7 MeV protons N83-27699
Computer simulation of geometrical effects on the stopping power for 7 MeV protons N83-27700
Current stopping power analyses N83-27701
Stopping power of Ni, Ag, Au and Pb for approximately 7 MeV/n alpha-particles and carbon ions (Z 3/1 proportional deviation from the Bethe formula) N83-27702
Mean excitation energies for use in Bethe's stopping-power formula N83-27703
Inner-shell ionization and stopping power N83-27704

Empirical stopping powers for ions in solids N83-27706
Stopping power of rare gases in amorphous silicon for MeV helium ions N83-27707
The stopping power of an electron gas for slow ions N83-27708
Energy loss of heavy ions as a function of target thickness: Ne yields C N83-27711
Energy losses to surface plasmons by charged particles N83-27713
Stopping of swift ions in condensed matter: The theory of effective charge N83-27714

STORAGE BATTERIES
Status of the DOE battery and electrochemical technology program, 3
[DE82-016912] N83-27469

STORAGE RINGS (PARTICLE ACCELERATORS)
Research support for plasma diagnostic on Elmo Bumpy Torus. Observations of EBT ring geometry by means of diamagnetic field measurements using a compensated ferromagnetic resonance magnetometer, and a preliminary numerical study of EBT flux penetration dynamics
[DE83-007883] N83-27864
Transverse coherent instabilities and a dipole feedback damper for coexisting coasting and bunched beams
[DE82-016613] N83-27869

STORAGE TANKS
Further study of the earthquake response of a broad cylindrical liquid-storage tank model
[PB83-147744] N83-27277
Solar project description: South Bridge Towers no. 6 multi-family cooperative, New York City, New York
[DE82-019252] N83-27421

STRAIN ENERGY METHODS
Department of Energy's Western Gas Sands Project multi-well experiment update
[DE82-018291] N83-27529

STRAIN GAGES
Experimental investigation of a mechanical impedance gauge based on measurement of strains on a conical rod
[TULEA-1981-66-T] N83-27272
Determination of mechanical impedance through strain measurement on an impacted slender rod
[TULEA-1982-33-T] N83-27274

STRATIFIED FLOW
On the numerical prediction of vertical turbulent exchange in stratified flows — geophysical flows, saline water
[TULEA-1981-08] N83-27340

STRATIGRAPHY
Geologic mapping of the Bauru Group in Sao Paulo state by LANDSAT images — Brazil
[E83-10341] N83-27316
Geology and mineral resources of the Baltimore, Boston, Lake Champlain, and Providence 1 deg by 2 deg NTMS quadrangles. National Uranium Resource Evaluation Program
[DE83-009825] N83-27327

STRATOSPHERE
Is there any chlorine monoxide in the stratosphere?
[NASA-TM-85026] N83-27518
SAM 2 measurements of the polar stratospheric aerosol. Volume 3: October 1979 to April 1980
[NASA-RP-1106] N83-27520

STREAMS
National Uranium Resource Evaluation Program: Supplement to hydrogeochemical and stream sediment reconnaissance basic data reports K/UR-405 and K/UR-408 through K/UR-443 GJBX-88(82)]
[DE82-013774] N83-27336
Literature review of sampling probes. Phase 5: Probe inlet design
[DE82-017327] N83-27505

STRESS (BIOLOGY)
Ecological effects of coal conversion N83-27484

STRESS ANALYSIS
Analysis of elevated-temperature tensile and creep properties of normalized and tempered 2-1/4 Cr-1 Mo steel
[DE82-018160] N83-27010
Correlation of compressive stress with spalling of plasma sprayed ceramic materials
[NASA-TM-83406] N83-27016
Nonlinear response arising from non self-similar crack growth in finite thickness plates
[DE83-005946] N83-27267
The post-processing approach in the finite element method. Part 1: Calculation of displacements, stresses, and other higher derivatives of the displacements
[AD-A125039] N83-27660
The post-processing approach in the finite element method. Part 2: The calculation of stress intensity factors
[AD-A125040] N83-27661
Use of analytical mechanics in defining acoustic-test methodology
[DE82-018615] N83-27802

STRESS CONCENTRATION
Numerics of measuring residual stresses in near-surface layers by means of X-ray diffraction analysis. Part 1: Constant and inclined stress distribution
[NRC/CNR-TT-2060] N83-27258
The stress distribution round an infinite row of circular holes in an orthotropic plate
[PB83-147157] N83-27279

STRESS CORROSION CRACKING
Kinetics of hydrogen-induced stress corrosion cracking. Part 1: Important features of cracking with regard to high strength steels
[BLL-RISLEY-TRANS-4701(9091.9F)] N83-26990

STRESS INTENSITY FACTORS
Kinetics of hydrogen-induced stress corrosion cracking. Part 1: Important features of cracking with regard to high strength steels
[BLL-RISLEY-TRANS-4701(9091.9F)] N83-26990
The post-processing approach in the finite element method. Part 2: The calculation of stress intensity factors
[AD-A125040] N83-27661

STRESS MEASUREMENT
Behavior of a rigid inclusion stressmeter in an anisotropic field
[DE82-016063] N83-27188
Numerics of measuring residual stresses in near-surface layers by means of X-ray diffraction analysis. Part 1: Constant and inclined stress distribution
[NRC/CNR-TT-2060] N83-27258

STRESS RELAXATION
The 48 hour multiaxial creep and recovery of 2618 aluminum alloy at 200C
[AD-A124993] N83-26998

STRESS WAVES
A study of the stress wave factor technique for the characterization of composite materials
[NASA-CR-3670] N83-27248

STRUCTURAL ANALYSIS
Systems design and comparative analysis of large antenna concepts N83-26863
Spacecraft materials research: A NASA perspective N83-26866
Prediction of the seismic responses of R/C frame-coupled wall structures
[PB83-149203] N83-27083
Analysis of progressive collapse of complex structures
[AD-A125266] N83-27260
Optimization of three dimensional combined truss/frame structures
[AD-A124988] N83-27263

STRUCTURAL DESIGN
Large Space Antenna Systems Technology, part 1
[NASA-CP-2269-PT-1] N83-26853
Satellite systems requirements for land mobile communications N83-26856
Antenna technology for orbital Very Long Baseline Interferometry (VLBI) N83-26859
A 15-meter deployable aperture microwave radiometer N83-26862
A large antenna system flight experiment N83-26905
Interference effects on the drag loading for groups of cylinders in uni-directional flow — water waves, offshore structures
[NMI-R-130] N83-27147
Wave forces on circular cylinders with large excrescences at low Keulegan and Carpenter numbers — water waves
[NMI-R-133] N83-27254
A comparison of two methods for calculating wave drift forces — water waves, offshore structures
[NMI-R-137] N83-27255
Potential of minicomputer/array-processor system for nonlinear finite-element analysis
[NASA-TM-84566] N83-27259

STRUCTURAL DESIGN CRITERIA
Development of deployable structures for large space platform systems, volume 1
[NASA-CR-170689] N83-26919

STRUCTURAL FAILURE
The numerical solution of pressure oscillations in an open cavity N83-26793

STRUCTURAL MEMBERS
Phase variation in wave force data — offshore structures
[NMI-R-132] N83-27253

STRUCTURAL PROPERTIES (GEOLOGY)
Acoustic emissions during deformation of intact and jointed welded tuff
[DE82-018346] N83-27805

STRUCTURAL STABILITY
Application of modern control theory for building structures
[PB83-144147] N83-27080
Joint opening nonlinear mechanism: Interface smeared crack model
[PB83-149195] N83-27084
Stability of an impact-loaded elastic column with two degrees of freedom
[TULEA-1981-05-T] N83-27270

STRUCTURAL VIBRATION
Numerical dynamic analysis of structures by the finite dynamic element method
[AD-A125213] N83-27642

SUBROUTINES
Revision of the shock loss re-estimation procedure of Program UDO300 utilizing a three-dimensional shock model
[AD-A124928] N83-27154

SUBSIDENCE
Technical support for geopressured-geothermal-well activities in Louisiana
[DE83-005297] N83-27473

SUBSONIC FLOW
Mixing of compressible fluid with application to ejector thrusters N83-26803
Finite element program for calculating flows in turbomachines with results for NASA task-1 compressor
[AD-A124987] N83-26841

SUBSONIC SPEED
Model aerodynamic test results for a refined actuated inlet ejector nozzle at simulated takeoff and cruise conditions
[NASA-CR-168051] N83-26816

SUBSTRATES
Correlation of compressive stress with spalling of plasma sprayed ceramic materials
[NASA-TM-83406] N83-27016
Role of amines in adhesion of polybutadiene to glass substrates. 4: The effect of amine structure and concentration on the strength of adhesion
[AD-A121686] N83-27028
Design of active impedance microwave monolithic circuits with a GaAs substrate
[ENST-E-82012] N83-27143
Continuous coating of indium tin oxide onto large area flexible substrates N83-27370
Engineering analysis of potential photosynthetic bacterial hydrogen-production systems
[DE82-019151] N83-27414

SULFIDES
H2S removal from coal gas at mid temperature (150 to 200 deg C)
[DE82-011004] N83-26963
High-temperature corrosion of iron in sulfur-containing atmosphere
[DE83-006965] N83-27007
The rare earth sulfides R2S/sub 3-x/(R = Sc, Er and Lu) as high temperature thermoelectric elements
[DE82-016382] N83-27396

SULFUR
Diesel fuel oils, 1982
[DE83-006115] N83-27051

SULFUR COMPOUNDS
Synthetic studies of antimony sulfur iodide and predictions/synthesis of new nitrogen containing crystal structures
[AD-A124977] N83-27681
Measurement of the thermodynamic quantities for the AG-S system by the EMF method
[NRC/CNR-TT-2062] N83-27892

SULFUR DIOXIDES
Fluidised-bed combustion. Initial results obtained in a 1-ft by 1-ft fluidised-bed combustor operating at pressures up to 20 ATM
[DE83-005956] N83-26974

SUMS
Approximation methods for the distribution of random sums N83-27692

SUNFLOWERS
Australia ground data collection 1981-82 crop year, appendixes A and B, volume 2
[E83-10316] N83-27305
Australia ground data collection 1981-82 crop year, volume 1
[E83-10317] N83-27306

SUPERCONDUCTING POWER TRANSMISSION
Status of the Argonne superconducting-linac heavy-ion booster N83-27730

SUPERCONDUCTORS
Longitudinal beam optimization of the Argonne superconducting heavy-ion liner accelerator N83-27780
High-power-density approaches to magnetic fusion energy: Problems and promise of compact Reversed-Field Pinch Reactors (CRFPR)
[DE82-015736] N83-27861

Experiments with phase transitions at very high pressure — compressed solidified gases, semiconductors, superconductors, and molecular crystals
[NASA-CR-3696] N83-27879
Experimental characterization of the flux-line lattice in superconducting V3Si
[DE83-004647] N83-27888
Fluxoid pinning by grain boundaries in bicrystals and polycrystals of niobium
[DE82-017406] N83-27891

SUPERCRITICAL WINGS
Some recent applications of XTRAN3S
[NASA-TM-85641] N83-26815

SUPERSONIC AIRCRAFT
Pilot human factors in stall/spin accidents of supersonic fighter aircraft
[NASA-TM-84348] N83-26846

SUPERSONIC DIFFUSERS
Dynamic distortion in a short s-shaped subsonic diffuser with flow separation — Lewis 8 by 6 foot Supersonic Wind Tunnel
[NASA-TM-84312] N83-26838

SUPERSONIC FLIGHT
Effects of varying podded nacelle-nozzle installations on transonic aeropropulsive characteristics of a supersonic fighter aircraft
[NASA-TP-2120] N83-26821

SUPERSONIC FLOW
Mixing of compressible fluid with application to ejector thrusters N83-26803
Wind tunnel investigation of separated flow over an afterbody in supersonic axisymmetric stream utilizing one-component laser-Doppler-velocimetry
[FFA-TN-1983-10] N83-26826

SUPERSONIC INLETS
Low flight speed acoustic results for a supersonic inlet with auxiliary inlet doors
[NASA-TM-83411] N83-27794

SUPERSONIC JET FLOW
Interaction of multiple supersonic jets with a transonic flow field
[NASA-TM-84369] N83-27152

SUPERSONIC NOZZLES
Effects of varying podded nacelle-nozzle installations on transonic aeropropulsive characteristics of a supersonic fighter aircraft
[NASA-TP-2120] N83-26821

SUPERSONIC SPEEDS
Model aerodynamic test results for a refined actuated inlet ejector nozzle at simulated takeoff and cruise conditions
[NASA-CR-168051] N83-26816

SUPPRESSORS
The performance of a PN spread spectrum receiver preceded by an adaptive interference suppression filter
[AD-A124903] N83-27098
Electromagnetic pulse protective properties in transient suppressors consisting of gas discharge tubes and filters
[FOA-C-30312-A3] N83-27142

SURFACE ACOUSTIC WAVE DEVICES
The performance of a PN spread spectrum receiver preceded by an adaptive interference suppression filter
[AD-A124903] N83-27098

SURFACE FINISHING
Silanization: Chemical surface modification of solid surfaces by silane coupling agents --- for detection systems
[FOA-C40166-C2(B2/A3)] N83-26984
Powder forging of compound steels, part 1
[TULEA-1982-16-PT-1] N83-27012
Surface grinding at high power avoiding thermal edge zone damage
[PNR-90161] N83-2707
Creep-feed grinding: A modern variant of the plane surface grinding process
[PNR-90163] N83-27074

SURFACE GEOMETRY
Aerodynamic characteristics of generalized bent biconic bodies for aero-assisted, orbital-transfer vehicles
[NASA-TM-84362] N83-26918

SURFACE LAYERS
Numerics of measuring residual stresses in near-surface layers by means of X-ray diffraction analysis. Part 1: Constant and inclined stress distribution
[NRC/CNR-TT-2060] N83-27258

SURFACE PROPERTIES
A method for determining liquid volatility at ambient temperatures using an infrared gas analyzer
[AD-A124906] N83-26940
Hydrogen transport in and through niobium
[DE82-017214] N83-26980
Thermochemistry of mixed explosives
[DE82-012149] N83-27045
Pneumatic conveying of coal and coal-limestone mixtures as applied to atmospheric fluidized-bed combustion
[DE82-015694] N83-27243

SURFACE REACTIONS
Molecular ingredients of heterogeneous catalysis
[DE82-018584] N83-26950

SURFACE ROUGHNESS
Antenna technology for orbital Very Long Baseline Interferometry (VLBI) N83-26859
Creep feed (single path) and conventional (multi-path) grinding - surface structure and comparison
[PNR-90162] N83-27073

SURFACE ROUGHNESS EFFECTS
A mathematical model of the urban boundary layer --- atmospheric models
[TULEA-1982-09] N83-27515

SURFACE STABILITY
Silanization: Chemical surface modification of solid surfaces by silane coupling agents --- for detection systems
[FOA-C40166-C2(B2/A3)] N83-26984

SURFACE TEMPERATURE
Curved film cooling admission tube
[NASA-CASE-LEW-13174-1] N83-27144
The impact of conventional surface data upon VAS regression retrievals in the lower troposphere
[NASA-TM-83987] N83-27522

SURFACES
Performance surfaces of adaptive predictors structures
[DE82-020090] N83-27663

SURVEILLANCE
A summary of mission and system performance requirements for large space antennas N83-26865

SURVEYS
Survey of deployable antenna concepts N83-26872

SURVIVAL
Estimating survival probability or reliability: Simulation assessments of the Delta method, Jacknife and bootstrap
[AD-A125000] N83-27249
Survival; motivation; preparation
[FOA-C-54045-H1] N83-27598

SWEAT COOLING
Effects of sleep deprivation on thermoregulation during exercise
[AD-A124982] N83-27580

SWITCHING
Current interruption and particle beam generation by a plasma focus
[AD-A125024] N83-27858

SYMMETRY
Eigenvalue problem for Hermitian matrices with time-reversal symmetry
[DE83-005629] N83-27695
Cavity loading associated with high-current RF linacs N83-27754

SYNCHRONISM
The statistical properties of autosynchronizing scramblers --- data transmission
[FUB-21-1982] N83-27120

SYNCHROTRON RADIATION
Beam instabilities in race track microtrons N83-27773
Automatic beam-steering of the Mainz Microtron N83-27775

SYNOPTIC METEOROLOGY
Synoptic precursors of three severe Brazilian freezes in the Pacific Ocean and South America
[INPE-2730-PRE/312] N83-27541

SYNTAX
Sandia Micro Generation for Integrated Circuits (SMAGIC) system and the hierarchical artwork (HAT) language
[DE82-009912] N83-27134
SCRAP: A language for systems programming
[CSIR-TWISK-263] N83-27614

SYNTHANE
Research strategy to permit greater utilization of domestic fossil energy resources
[DE82-018339] N83-27405

SYNTHESIS (CHEMISTRY)
Molecular-orbital calculations for polynitropolyhedranes
[DE82-018390] N83-27023
Research in energetic compounds
[AD-A124911] N83-27024

SYNTHETIC APERTURE RADAR
Ionospheric irregularities and their potential impact on synthetic aperture radars
[AD-A124942] N83-27100

SYNTHETIC FUELS
Synthetic-fuel combustion: Pollutant formation. Scot-initiation mechanisms in burning aromatics
[DE83-005611] N83-26945
Soot formation in synthetic-fuel droplets
[DE82-018420] N83-26958
Gasification in pulverized coal flames. Investigation of pulverized coal-combustors and gasifiers: Multiple sub-reactor model and experimental results, part 2
[DE82-013001] N83-26965
Spray combustion of synthetic fuels. Phase 2: Spray-combustion phenomena
[DE82-015489] N83-26970
Integrated forecasting model, synthetic-fuels study. Volume 2: Model structure and input data
[DE82-905778] N83-27053
Increased automobile fuel efficiency and synthetic fuels: Alternatives for reducing oil imports. Background paper number 2: Selected technical and economic comparison of synthetic options
[PB83-147363] N83-27057

SYSTEM EFFECTIVENESS
Solar-energy-system performance evaluation. San Anselmo School, San Jose, California, April 1981-March 1982
[DE82-020142] N83-27422
Analysis of field-test data from domestic solar-water heaters in the southern United States
[DE83-006822] N83-27455

SYSTEM FAILURES
Investigation into the availability levels of flexible production systems
[PNR-90157] N83-27902

SYSTEMS ANALYSIS
Dynamic characteristics of aerial refueling systems
[AD-A124770] N83-26830
Systems design and comparative analysis of large antenna concepts N83-26863
LANDSAT-D flight segment operations manual. Appendix A: Coefficients/calibration data
[E83-10287] N83-27289
Collector trade-off study for BDM PRDA-35 application
[DE82-013532] N83-27434
SCRAP: A language for systems programming
[CSIR-TWISK-263] N83-27614

SYSTEMS COMPATIBILITY
The distributed control system for the Fermilab 200 MeV Linac N83-27782
Low-cost megawatt RF power sources for linear accelerators to 70MHz and above
[LBL-13024] N83-27784

SYSTEMS ENGINEERING
Example of a planned and implemented flexible manufacturing system suitable for development in stages
[PNR-90154] N83-27070
Optimized two-capacity advanced electric heat pump
[DE82-017447] N83-27173
LANDSAT-D flight segment operations manual, volume 1
[E83-10285] N83-27287
LANDSAT-D flight segment operations manual, volume 2
[E83-10286] N83-27288
Probabilistic design using numerical optimization
[AD-A125232] N83-27651
Use of the regularization method for designing the equilibrium system of a Tokamak reactor having a specified plasma geometry
[BLL-CTO-2117-(9091.9F)] N83-27851

SYSTEMS INTEGRATION
Development of deployable structures for large space platform systems, volume 1
[NASA-CR-170689] N83-26919

T

TAKEOFF
Model aerodynamic test results for a refined actuated inlet ejector nozzle at simulated takeoff and cruise conditions
[NASA-CR-168051] N83-26816

TANZANIA
Satellite monitoring of vegetation and geology in semi-arid environments --- Tanzania
[E83-10343] N83-27318

TARGET ACQUISITION
Enhanced tracking of airborne targets using a correlator-Kalman filter
[AD-A124884] N83-27097

TARGET RECOGNITION
Information theoretic detection of objects embedded in cluttered aerial scenes
[AD-A124975] N83-27187
Modular incoherent CO sub 2 TEA lasers
[AD-A124960] N83-27204

TARGET THICKNESS
Anomalies in the thickness dependence of the energy loss of helium and nitrogen ions in very thin carbon foils N83-27710
Energy loss of heavy ions as a function of target thickness: Ne yields C N83-27711
TARS
Dew points of hot gases from coal-gasification processes
[DE82-016337] N83-26964
TEA LASERS
Modular incoherent CO sub 2 TEA lasers
[AD-A124960] N83-27204
TECHNOLOGICAL FORECASTING
Remarks on future accelerators and future physics
[DE83-006643] N83-27822
TECHNOLOGY ASSESSMENT
Technique and applications of X-ray photoelectron spectroscopy
[AERE-R-10803] N83-26988
Status of alcohol fuels utilization technology for highway transportation: A 1981 perspective. Volume 2: Compression-ignition engines
[DE83-008127] N83-27036
Hydrogen derived from ammonia: Small-scale costs
[DE82-012720] N83-27040
Integrated forecasting model, synthetic-fuels study. Volume 2: Model structure and input data
[DE82-905778] N83-27053
Increased automobile fuel efficiency and synthetic fuels: Alternatives for reducing oil imports. Background paper number 2: Selected technical and economic comparison of synthetic options
[PB83-147363] N83-27057
Present situation in development of automated machining systems in Europe and America
[PNR-90152] N83-27068
Surface grinding at high power avoiding thermal edge zone damage
[PNR-90161] N83-27072
Creep feed (single path) and conventional (multi-path) grinding - surface structure and comparison
[PNR-90162] N83-27073
Creep-feed grinding: A modern variant of the plane surface grinding process
[PNR-90163] N83-27074
A NASA high-power space-based laser research and applications program
[NASA-SP-464] N83-27200
Assessment of the geothermal resources of Kansas
[DE83-003216] N83-27338
The feasibility of biogas production on farms
[DE83-007385] N83-27385
Future Engineering Needs of Magnetic Fusion
[PB83-149757] N83-27874
TECHNOLOGY TRANSFER
Geo energy research and development: Technology transfer update
[DE83-007225] N83-27395
TECHNOLOGY UTILIZATION
Production planning, production systems for flexible automation
[PNR-90150] N83-27067
Design requirements for creep-feed grinders, part 3. Application of outside diameter creep-feed grinding, part 4
[PNR-90165-PT-3/4] N83-27076
End-Use Products of Fusion Energy: Alternatives and Their Implications to the Fusion Energy R and D Strategy
[PB83-151696] N83-27873
TECTONICS
The Ponta Grossa Arch: A proposal for ts configuration and evolution from the interpretation of remote sensing data
[E83-10343] N83-27320
Sedimentology of the Mesaverde formation of Rifle Gap, Colorado and implications for gas-bearing intervals in the subsurface
[DE82-013396] N83-27530
TELECOMMUNICATION
A model for forecasting the country's general use data transmission network
[AD-A124847] N83-27095
Basic EMC technology advancement for C3 systems. Volume 4A: Coupling of electromagnetic fields onto transmission lines. A comparison of the transmission of line model and the method of moments
[AD-A124861] N83-27102
TELECONFERENCING
Psychological and system variables in team problem solving: Experimental studies of computer-mediated participation
[AD-A124924] N83-27596
TELEMETRY
Performance optimization of PCM/SCO telemetry systems
[DE82-015797] N83-26917
Shock-hardened, high-frequency, PCM system with memory for Earth-penetrator-study applications
[DE82-017644] N83-27242
LANDSAT-D flight segment operations manual. Appendix A: Coefficients/calibration data
[E83-10287] N83-27289
LANDSAT-4 to ground station interface description
[E83-10292] N83-27291
TELEOPERATORS
A robot in space as a large space structures control experiment N83-26899
TELEPHONES
Dissemination of digital satellite imagery through telephone lines
[INPE-2725-PRE/309] N83-27089
TEMPERATURE CONTROL
Sleep deprivation depresses thermoregulatory responses to physical exercise
[AD-A125062] N83-27581
TEMPERATURE DEPENDENCE
A method for determining liquid volatility at ambient temperatures using an infrared gas analyzer
[AD-A124906] N83-26940
Autoignition of kerosene/oxygen mixtures in a fluidized bed
[DE82-016376] N83-26952
Thermal Desorption Spectroscopy (TDS) of hydrogen from niobium
[DE82-012024] N83-26981
Corner-turning characteristics of TATB/HMX/Kel-F mixtures
[DE83-006931] N83-27037
Muon spin-rotation study on magnetite
[DE82-019535] N83-27834
An NMR study of hydrogen diffusion in metal hydrides containing parametric impurities
[DE83-004859] N83-27890
TEMPERATURE DISTRIBUTION
Detectability of defects by thermal non-destructive testing
[AERE-R-10802] N83-27250
TEMPERATURE EFFECTS
Fundamental pyrolysis studies
[DE82-009808] N83-26969
Technological characteristics of creep-feed grinding. Raised cutting forces and reduced work piece temperatures, part 2
[PNR-90164-PT-2] N83-27075
High temperature properties of the seam weld portion in 1% Cr-0.5% Mo ERW boiler tubing after long-term aging N83-27223
Influence of temperature upon elastic limit and dislocation mobility of single-crystal HgI2
[DE82-017694] N83-27266
TEMPERATURE GRADIENTS
Thermal analysis of the vertical bridgman semiconductor crystal growth technique
[NASA-CR-172627] N83-27875
TEMPERATURE MEASUREMENT
Method of studying the operating temperature of gas turbines — aeroengines
[PNR-90159] N83-26842
Research options for the development of sensors to measure the thermal state of solid steel bodies
[DE83-007253] N83-27191
Simulating soybean canopy temperature as affected by weather variables and soil water potential
[E83-10319] N83-27307
TEMPERATURE PROFILES
Liquid-phase methanation/shift process development
[DE82-015214] N83-26961
The impact of conventional surface data upon VAS regression retrievals in the lower troposphere
[NASA-TM-83987] N83-27522
TEMPORAL DISTRIBUTION
Monitoring tropical vegetation succession with LANDSAT data
[E83-10306] N83-27296
TENNESSEE VALLEY (AL-KY-TN)
Overview of fuel alcohol from agricultural crops with emphasis on the Tennessee Valley
[DE82-016932] N83-27050
TENSILE STRENGTH
Analysis of elevated-temperature tensile and creep properties of normalized and tempered 2-1/4 Cr-1 Mo steel
[DE82-018160] N83-27010
TENSILE STRESS
Kinetics of void formation in strained metals
[ISSN-0208-5658] N83-26993
Joint opening nonlinear mechanism: Interface smeared crack model
[PB83-149195] N83-27084
TERRAIN
Survivability of interdiction aircraft: Sensitivity to terrain following, command altitude, velocity and electronic counter measures
[AD-A124870] N83-26833
TERRAIN FOLLOWING AIRCRAFT
Survivability of interdiction aircraft: Sensitivity to terrain following, command altitude, velocity and electronic counter measures
[AD-A124870] N83-26833
TERRESTRIAL RADIATION
DIF1: A dispersion program which can handle pollution and reflection
[ATMOS/82/11] N83-27478
TEST FACILITIES
Manned assembly of space structures N83-26889
Test results and description of a 1-kW free-piston Stirling engine with a dashpot load
[NASA-TM-83407] N83-27348
TETRODES
Modulator reliability and bandwidth improvement: Replacing tetrodes with MOSFETs N83-27783
TEXTURES
Texture functions in image analysis: A computationally efficient solution
[NASA-TM-85022] N83-27326
THEMATIC MAPPING
Evaluation of ground cover and land use in the PDRI-AM remote sensing technique program area — Brazil
[E83-10230] N83-27283
Selecting band combinations with thematic mapper data
[E83-10303] N83-27294
Monitoring land degradation in southern Tunisia: A test of LANDSAT imagery and digital data
[E83-10320] N83-27308
Detection of aspen/conifer forest mixes from multitemporal LANDSAT digital data — Bear River Range, Rocky Mountains
[E83-10324] N83-27309
Study of LANDSAT-D thematic mapper performance as applied to hydrocarbon exploration — Southern Ontario, Lawton, Oklahoma; Owl Creek, Wyoming; Washington, D.C.; and Death Valley California
[E83-10325] N83-27310
The classification of LANDSAT data for the Orlando, Florida, urban fringe area
[E83-10327] N83-27311
Mapping from space and the SPOT project N83-27477
THEORETICAL PHYSICS
Discussions with Jens
[DE82-016622] N83-27896
THERMAL BATTERIES
Improvements in Li(Si)/FeS2 thermal battery technology
[DE82-017779] N83-27463
THERMAL CONDUCTIVITY
The energy balance in axisymmetric steady compressible swirl flows with closed streamlines N83-26789
Thermophysical properties of coal liquids
[DE82-013366] N83-26967
Effects of particle characteristics on performance of RRSK PETN
[DE82-018553] N83-27044
A comparison of the finite beat conduction equation with temperature dependent conductivity
[AD-A124918] N83-27647
Thermal analysis of the vertical bridgman semiconductor crystal growth technique
[NASA-CR-172627] N83-27875
Thermal conductance of pressed contacts at liquid helium temperatures
[NASA-TM-84365] N83-27876
THERMAL CONTROL COATINGS
Transparent Heat Reflecting Coatings (THRC) based on highly doped tin oxide and indium oxide N83-27362
Transparent heat insulating coatings on a polyester film N83-27365
THERMAL CYCLING TESTS
Testing of felt-ceramic materials for combustor applications
[NASA-CR-168103] N83-26837
THERMAL DECOMPOSITION
I. R. emission measurements of shocked rocket propellants by time-resolved infrared radiometry
[DE83-007356] N83-27042
Thermochemistry of mixed explosives
[DE82-012149] N83-27045
THERMAL DISSOCIATION
Thermal dissociation of diatomic molecules N83-26810

THERMAL ENERGY
Laboratory simulation of a deep-ocean in-situ heat-transfer experiment
[DE82-018656] N83-27171
User manual AQUASTOR: A computer model for cost analysis of aquifer thermal-energy storage coupled with district heating or cooling systems. Volume 2: Appendices
[DE82-013889] N83-27631

THERMAL EXPANSION
Spacecraft materials research: A NASA perspective N83-26866

THERMAL INSULATION
Thermal-barrier coatings for utility gas turbines
[NASA-TM-85349] N83-27022
Field experiences underscore the importance of moisture control in energy-efficient homes
[DE83-901234] N83-27064
Handbook of thermal insulation applications
[AD-A125264] N83-27158
Project DEEP STEAM
[DE82-016394] N83-27389
Thermal performance of a double-envelope house
[DE82-018061] N83-27417
Economic analysis of the integrated heating and cooling potential of a residential passive-solar water wall design
[DE82-018372] N83-27419
Heat transfer/boundary layer investigation of heating discrepancies in wind tunnel testing of orbiter insulating articles
[AD-A124603] N83-27893

THERMAL SHOCK
Thermo-mechanical and thermal behavior of high-temperature structural materials
[AD-A125242] N83-27026

THERMAL STRESSES
Analysis of a failed spent-char transfer line from the IGT HYGAS coal-gasification pilot plant
[DE82-014906] N83-26947
Thermo-mechanical and thermal behavior of high-temperature structural materials
[AD-A125242] N83-27026

THERMIONIC CONVERTERS
Electron emission characteristics of tungsten alloys: Mee 492 — for use in thermionic converters
[DE83-006774] N83-27006

THERMIONIC EMISSION
Electron emission characteristics of tungsten alloys: Mee 492 — for use in thermionic converters
[DE83-006774] N83-27006

THERMIONICS
CID thermionic gun system N83-27739

THERMOCHEMISTRY
Thermochemistry of mixed explosives
[DE82-012149] N83-27045

THERMODYNAMIC COUPLING
Thermal analysis of the vertical bridgman semiconductor crystal growth technique
[NASA-CR-172627] N83-27875

THERMODYNAMIC CYCLES
Thermochemical processes for solar hydrogen production
[DE82-019575] N83-27047

THERMODYNAMIC EFFICIENCY
Combustion losses in automotive spark ignition and diesel engines
[DE83-006015] N83-27244
High-power-density approaches to magnetic fusion energy: Problems and promise of compact Reversed-Field Pinch Reactors (CRFPR)
[DE82-015736] N83-27861

THERMODYNAMIC PROPERTIES
The energy balance in axisymmetric steady compressible swirl flows with closed streamlines N83-26789
Residential photovoltaic system simulation: Thermal aspects
[DE82-007784] N83-27399
The use of the Blake computer program to calculate thermodynamic properties of Australian-made gun propellants
[AD-A118605] N83-27615
Measurement of the thermodynamic quantities for the AG-S system by the EMF method
[NRC/CNR-TT-2062] N83-27892
A general approach to the testing of binary solubility systems for thermodynamic consistency. Consolidated Fuel Reprocessing Program
[DE83-007173] N83-27897
Coordination of Physical, Chemical, and Thermodynamic Properties for Coal Conversion: Proceedings of the Oak Ridge Conference
[DE83-007169] N83-27898

THERMODYNAMICS
Phase 2 Brayton/Rankine 10-ton gas-fired space-conditioning system
[DE82-016367] N83-27355
Satellite applications to acoustic prediction systems
[AD-A125027] N83-27564
Linear parabolic equations with a singular lower order coefficient
[AD-A125245] N83-27656
Application of computer modeling to the study of the thermodynamic forces acting on a building
[AD-A125227] N83-27894

THERMOELASTICITY
Thermoelastic response to a short laser pulse
[AD-A125247] N83-27203

THERMOELECTRICITY
The rare earth sulfides R2S/sub 3-x/(R = Sc, Er and Lu) as high temperature thermoelectric elements
[DE82-016382] N83-27396

THERMOGRAVIMETRY
Preparation, characterization, physical testing and performance of fluorocarbon membranes and separators
[NASA-CR-167880] N83-26936
Ultrasonic mixing of epoxy curing agents
[NASA-TM-85643] N83-27018

THERMOHYDRAULICS
Effects of hydrazine and pH on the corrosion of copper-alloy materials in AVT environments with oxygen
[DE83-901124] N83-27004

THERMOMECHANICAL TREATMENT
Dynamic powder compaction of rapidly solidified Path A alloy with increased carbon and titanium content
[DE82-017252] N83-27008

THERMOMETERS
Intercomparison of water triple point cells and standard platinum resistance thermometers
[DE83-005971] N83-27196

THERMOPHYSICAL PROPERTIES
Thermophysical properties of coal liquids
[DE82-013366] N83-26967
Thermo-mechanical and thermal behavior of high-temperature structural materials
[AD-A125242] N83-27026

THERMOREGULATION
A linearized, time dependent model of the heat transfer and thermoregulatory responses occurring upon immersion in cold water
[AD-A124972] N83-27586

THETA PINCH
Experimental studies on energy transport in a reversed field theta pinch
[IPPJ-626] N83-27853
Plasma behaviors in the open field region of reversed-field theta-pinch
[IPPJ-624] N83-27856
Stability and confinement of spheromaks and field-reversed configurations
[DE82-018378] N83-27862

THICK WALLS
A new class of steels for thick-wall pressure vessels
[DE83-004101] N83-26999

THICKNESS
Creep characteristics of butt welded joints for thick 2 1/4Cr-1Mo pipework and pressure vessels N83-27233

THIN FILMS
Quantitative analysis of phosphosilicate glass films on silicaon wafers
[DE82-017642] N83-26953
Aluminum nitride thin film and composite bulk wave resonators
[DE82-019303] N83-27135
Optical properties of transparent heat mirrors based on thin films of TiN, ZrN, and HfN N83-27361
Transparent heat insulating coatings on a polyester film N83-27365
New techniques for roll coating of optical thin film N83-27371
Development of copper sulfide/cadmium thin-film solar cells
[DE82-014308] N83-27416
Preparation and characterization of glassy and crystalline mixed chalcopyrite semiconducting compounds
[DE83-005352] N83-27889

THIN LAYER CHROMATOGRAPHY
Quantitative analysis of TATB impurities by thin layer chromatography
[DE83-007094] N83-26977

THREE DIMENSIONAL FLOW
Compound-compressible nozzle flow N83-26790
Some recent applications of XTRAN3S
[NASA-TM-85641] N83-26815
Dynamics of three-dimensional disturbances in water table flow — water waves
[TULEA-1982-36-T] N83-27175

THREE DIMENSIONAL MOTION
Quaternions in computer vision and robotics
[AD-A125876] N83-27600

THRUST PROGRAMMING
Large space systems auxiliary propulsion requirements N83-26864

THRUST REVERSAL
Effects of varying podded Nacelle-nozzle installations on transonic aeropropulsive characteristics of a supersonic fighter aircraft
[NASA-TP-120] N83-26823
Thrust performance of a variable-geometry, divergent exhaust nozzle on a turbojet engine at altitude
[NASA-TP-2171] N83-26839

THRUST VECTOR CONTROL
Effects of varying podded Nacelle-nozzle installations on transonic aeropropulsive characteristics of a supersonic fighter aircraft
[NASA-TP-120] N83-26823
Thrust performance of a variable-geometry, divergent exhaust nozzle on a turbojet engine at altitude
[NASA-TP-2171] N83-26839

THRUST-WEIGHT RATIO
The plasma powerplant N83-26927

THUNDERSTORMS
RF radiation from lightning correlated with aircraft measurements during storm hazards-82
[NASA-TM-85007] N83-27537

TIDES
Tidal and lunar data for Point Mugu, San Nicolas Island, and the Barking Sands area during 1983
[AD-A124810] N83-27565

TIMBER IDENTIFICATION
Detection of aspen/conifer forest mixes from multitemporal LANDSAT digital data — Bear River Range, Rocky Mountains
[E83-10324] N83-27309

TIMBER INVENTORY
Wildland inventory and resource modeling for Douglas and Carson City Counties, Nevada, using LANDSAT and digital terrain data
[E83-10302] N83-27293

TIME
Project scheduling with resource considerations
[AD-A124938] N83-27901

TIME DEPENDENCE
Computational fluid dynamics: An engineering tool? N83-26796
Ignition and flame-propagation studies with adaptive numerical grids
[DE83-005462] N83-26976
Multiaxial creep of 2618 aluminum under proportional loading steps
[AD-A125023] N83-26997
Mechanisms of damage accumulation in time-dependent cyclic deformation
[DE83-000993] N83-27002
Response of bainitic 2 1/4 Cr-1 Mo steel to creep-fatigue loadings at 482 deg C
[DE82-017445] N83-27011
Relation of coal characteristics to liquefaction behavior. Part 2: Continuous flow reactor studies by Gulf Research and Development Co.
[DE82-016938] N83-27046
A linearized, time dependent model of the heat transfer and thermoregulatory responses occurring upon immersion in cold water
[AD-A124972] N83-27586
Large amplitude time periodic solutions of a semilinear wave equation
[AD-A125257] N83-27654
New formulation of the RFQ radial matching section N83-27789
The incorporation of particle collisions in the time-dependent Hartree-Fock approximation
[DE82-017481] N83-27818
Recent results on the dense Z-pinch
[DE82-015802] N83-27859

TIME FUNCTIONS
Method of studying the operating temperature of gas turbines — aeroengines
[PNR-90159] N83-26842
Technological characteristics of creep-feed grinding. Raised cutting forces and reduced work piece temperatures, part 2
[PNR-90164-PT-2] N83-27075

TIME OF FLIGHT SPECTROMETERS
Energy loss of heavy ions as a function of target thickness: Ne yields C N83-27711

TIME OPTIMAL CONTROL
Time characteristic, capacity and conditions for the adoption of flexible production systems — for metal working
[PNR-90156] N83-27071

TIME SERIES ANALYSIS
A compilation of moored instrument data and associated oceanographic observations. Volume 30: Gulf Stream extension and Norwegian Sea overlow intrusion experiments, 1979 - 1980
[AD-A124818] N83-27562
TIN OXIDES
High quality transparent heat reflectors of reactively evaporated indium tin oxide N83-27363
Continuous coating of indium tin oxide onto large area flexible substrates N83-27370
New techniques for roll coating of optical thin film N83-27371
TITANIUM
Dynamic powder compaction of rapidly solidified Path A alloy with increased carbon and titanium content
[DE82-017252] N83-27008
Design and development of a titanium heat-pipe space radiator
[DE82-013749] N83-27166
Retention and recycling of plasma-edge hydrogen isotopes in C and TiC
[DE82-019959] N83-27814
TITANIUM OXIDES
Deactivation and regeneration of hydrogenolysis activity over Rh-Ag bimetallic catalysts supported on TiO2
[DE82-011240] N83-27449
TOKAMAK DEVICES
Retention and recycling of plasma-edge hydrogen isotopes in C and TiC
[DE82-019959] N83-27814
Use of the regularization method for designing the equilibrium system of a Tokamak reactor having a specified plasma geometry
[BLL-CTO-2117-(9091.9F)] N83-27851
Linear problem of inductor synthesis for a Tokamak thermonuclear apparatus
[BLL-CTO-2116-(9091.9F)] N83-27852
Measurement of the helical field of JIPP T-11
[IPPJ-625] N83-27855
Shear Alfven waves in Tokamaks
[DE83-007194] N83-27872
TOLERANCES (MECHANICS)
One-sided tolerance limits for balanced one-way ANOVA random model
[AD-A125026] N83-27669
TOLERANCES (PHYSIOLOGY)
Subtle consequences of exposure to weak microwave fields: Are there non-thermal effects?
[AD-A125169] N83-27090
TOPOGRAPHY
Remote Sensing techniques used to characterize soil erosion in southwestern Sao Paulo state --- Brazil
[E83-10339] N83-27315
Effect of scene illumination conditions on digital enhancement techniques of multispectral scanner LANDSAT images
[E83-10344] N83-27319
Numerical simulation of the influence of small scale mountain ranges on a baroclinic wave
[AD-A125301] N83-27546
Bathymetric data and analysis for the NRL remote sensing experiment: Phelps Bank, July 1982
[AD-A125220] N83-27563
TOPOLOGY
Lie algebras and flexible lie-admissible algebras. Hadronic press monographs in mathematics number 1
[DE83-007252] N83-27694
TOROIDAL PLASMAS
Measurement of the helical field of JIPP T-11
[IPPJ-625] N83-27855
Compact toroid experiments: Spheromaks and field-reversed configurations
[DE82-015882] N83-27865
Ideal MHD stability calculations in axisymmetric toroidal coordinate systems
[DE82-009830] N83-27866
TORSION
Stability of laminated composite shells subjected to uniform axial compression and torsion
[AD-A125204] N83-27262
TOTAL ENERGY SYSTEMS
Develop and test fuel cell powered on-site integrated total energy system
[NASA-CR-168021] N83-27348
TOUGHNESS
Toughness of submerged arc weld metals of controlled rolled Nb bearing steel N83-27232
Crack layer morphology and toughness characterization in steels
[NASA-CR-168154] N83-27256
TOWERS
Demonstration of an a-c utility connected wind generator in a urban setting
[DE83-006696] N83-27387
Meteorological Effects of Thermal Energy Releases (METER) program
[DE83-006313] N83-27502
Meteorological tower data, Grand Junction Tailings Site, Colorado
[DE82-018919] N83-27555
TRACKING (POSITION)
Lateral flying qualities of highly augmented fighter aircraft, volume 1
[AD-A118070] N83-26835
Computer simulation of a multiaxis air-to-air tracking task using the optimal pilot control model
[AD-A125302] N83-27597
Computerized measurement and tracking of acoustical resonances
[AD-A125286] N83-27799
TRANSFORMATIONS (MATHEMATICS)
Approximation methods for the distribution of random sums N83-27692
TRANSIENT HEATING
Transient heat flow along uni-directional fibers in composites
[AD-A122926] N83-26929
A comparison of the finite beat conduction equation with temperature dependent conductivity
[AD-A124918] N83-27647
TRANSIENT RESPONSE
A statistical approach to the study of localized corrosion
[AERE-R-10832] N83-27014
TRANSISTOR CIRCUITS
Two papers on circuit extraction
[AD-A125304] N83-27130
TRANSITION METALS
Coal-gasification catalysis mechanisms
[DE82-013824] N83-26960
TRANSLATIONAL MOTION
Motion estimation based on multiple local constraints and nonlinear smoothing
[AD-A124836] N83-27640
TRANSMISSION EFFICIENCY
New formulation of the RFQ radial matching section N83-27789
TRANSMISSION LINES
Dissemination of digital satellite imagery through telephone lines
[INPE-2725-PRE/309] N83-27089
Basic EMC technology advancement for C3 systems. Volume 4A: Coupling of electromagnetic fields onto transmission lines. A comparison of the transmission of line model and the method of moments
[AD-A124861] N83-27102
TRANSMITTERS
Performance optimization of PCM/SCO telemetry systems
[DE82-015797] N83-26917
TRANSONIC FLIGHT
Model aerodynamic test results for a refined actuated inlet ejector nozzle at simulated takeoff and cruise conditions
[NASA-CR-168051] N83-26816
TRANSONIC FLOW
Some recent applications of XTRAN3S
[NASA-TM-85641] N83-26815
Effects of varying podded Nacelle-nozzle installations on transonic aeropropulsive characteristics of a supersonic fighter aircraft
[NASA-TP-120] N83-26823
Interaction of multiple supersonic jets with a transonic flow field
[NASA-TM-84369] N83-27152
TRANSONIC WIND TUNNELS
Programs for the transonic wind tunnel data processing installation. Part 10: Six component measurements updated
[AD-A122248] N83-26824
TRANSPIRATION
Simulating soybean canopy temperature as affected by weather variables and soil water potential
[E83-10319] N83-27307
TRANSPORT PROPERTIES
Theoretical studies and application N83-27497
TRANSPORT THEORY
Ignition and flame-propagation studies with adaptive numerical grids
[DE83-005462] N83-26976
Hydrogen transport in and through niobium
[DE82-017214] N83-26980
Experimental studies on energy transport in a reversed field theta pinch
[IPPJ-626] N83-27853
Preliminary calculations for testing a fission/fusion hybrid blandket module in a fission reactor: Addendum 2
[DE82-015622] N83-27860
TRANSURANIUM ELEMENTS
Incinerator development program for processing transuranic waste at the Idaho National Engineering Laboratory
[DE82-017265] N83-27839
TRANSVERSE WAVES
Computer simulation of longitudinal-transverse space charge effects in bunched beams N83-27751
On space charge instabilities and emittance growth in RF linacs N83-27752
TRAVELING WAVE TUBES
Traveling-wave tube amplifier characteristics study for stochastic beam-cooling experiments
[DE83-005867] N83-27132
TRAVELING WAVES
Linearized stability of extreme shock profiles for systems of conservation laws with viscosity
[AD-A125256] N83-27159
TREES
Terrestrial and riverine ecology N83-27482
TREES (MATHEMATICS)
An empirical study of insertion and deletion in binary search trees
[AD-A125210] N83-27639
Anomalies in parallel branch-and-bound algorithms
[AD-A125290] N83-27648
TRENDS
Production planning, production systems for flexible automation
[PNR-90150] N83-27067
TRIBOLOGY
NASA interdisciplinary collaboration in tribology. A review of oxidational wear
[NASA-CR-3686] N83-27021
TRIODES
Domed-grid-cathode project phases 1 and 2
[DE82-013844] N83-27136
TRITIUM
Retention and recycling of plasma-edge hydrogen isotopes in C and TiC
[DE82-019959] N83-27814
TROMBE WALLS
Phase-change materials in masonry construction
[DE83-007227] N83-27061
TROPICAL REGIONS
Monitoring tropical vegetation succession with LANDSAT data
[E83-10306] N83-27296
TROPICAL STORMS
Low latitude upper tropospheric cyclonic vortices in the South Atlantic: Their origin, characteristics and effects on tropical convection over eastern Brazil
[INPE-2729-PRE/311] N83-27540
Southern Hemisphere application of the Navy nested tropical cyclone model
[AD-A125011] N83-27545
TROPOPAUSE
Aircraft measurements of trace gases and particles near the tropopause
[NASA-CR-3691] N83-27542
TROPOSPHERE
The impact of conventional surface data upon VAS regression retrievals in the lower troposphere
[NASA-TM-83987] N83-27522
Low latitude upper tropospheric cyclonic vortices in the South Atlantic: Their origin, characteristics and effects on tropical convection over eastern Brazil
[INPE-2729-PRE/311] N83-27540
TRUSSES
Advances in structural concepts N83-26868
Status of deployable geo-truss development N83-26875
Box truss development and applications N83-26876
MAST space research flight experiment N83-26904
SADE: A space experiment to demonstrate structural assembly N83-26906
Optimization of three dimensional combined truss/frame structures
[AD-A124988] N83-27263
TRYPTOPHAN
Interstellar proteins and the discovery of a new interstellar absorption feature at lambda = 2800A
[PREPRINT-86] N83-27944
TUNGSTEN ALLOYS
Electron emission characteristics of tungsten alloys: Mee 492 --- for use in thermionic converters
[DE83-006774] N83-27006
TUNISIA
Monitoring land degradation in southern Tunisia: A test of LANDSAT imagery and digital data
[E83-10320] N83-27308
TURBINE BLADES
Thermal-barrier coatings for utility gas turbines
[NASA-TM-85349] N83-27022

Fabrication of low-cost Mod-0A wood composite wind turbine blades
[NASA-TM-83323] N83-27347
A new look at turbulence experienced by a rotating wind turbine
[DE83-007044] N83-27383
TURBINE EXHAUST NOZZLES
A one-dimensional procedure for estimating the performance of ejector nozzles N83-26806
Effects of non-constant enthalpy addition on fan-nozzle combinations N83-26807
TURBINES
Wellhead power production with a rotary separator turbine (RP 1196) N83-27376
Small geothermal power plant. Portable turbine generator N83-27380
Conceptual design of the Truscott Brine Lake solar pond system. Volume 2: Utility-integrated scenario
[DE83-008133] N83-27386
TURBOCOMPRESSORS
The use of vortex generators as inexpensive compressor casing treatment N83-26798
End wall flow characteristics and overall performance of an axial flow compressor stage
[NASA-CR-3671] N83-26819
Finite element program for calculating flows in turbomachines with results for NASA task-1 compressor
[AD-A124987] N83-26841
Revision of the shock loss re-estimation procedure of Program UDO300 utilizing a three-dimensional shock model
[AD-A124928] N83-27154
TURBOFAN ENGINES
Advances in ejector technology: A tribute to Hans von Ohain's vision N83-26805
TURBOFANS
Effects of non-constant enthalpy addition on fan-nozzle combinations N83-26807
TURBOJET ENGINES
Thrust performance of a variable-geometry, divergent exhaust nozzle on a turbojet engine at altitude
[NASA-TP-2171] N83-26839
An investigation of the effectiveness of smoke suppressant fuel additives for turbojet applications
[AD-A125025] N83-27034
TURBOMACHINE BLADES
Input generator for Denton 3-dimensional turbomachine-blade-row analysis code
[NASA-TM-23324] N83-26817
TURBOMACHINERY
Hybrid hydrostatic/ball bearings in high-speed turbomachinery
[NASA-CR-168124] N83-27213
TURBULENCE
Degradation of a laser beam by a turbulent jet N83-26799
On the large scale structure of turbulence in boundary layer and shear flows N83-26800
TURBULENT BOUNDARY LAYER
Flat-plate drag measurements with vortex generators in turbulent boundary layer
[NASA-CR-172125] N83-26814
Research on wall turbulence
[AD-A124831] N83-27153
TURBULENT FLOW
Boundary-layer transition on blunt, slender cones at hypersonic Mach numbers N83-26794
Verification studies of entrained-flow gasification and combustion systems with the SIMMER-II code
[DE82-012148] N83-26978
Deposition of aerosols in sampling tubes
[DE82-017311] N83-27062
Research on wall turbulence
[AD-A124831] N83-27153
Flash evaporation from turbulent water jets
[DE83-007311] N83-27168
A turbulence model for depth-averaged equations of motion — water currents
[TULEA-1981-07] N83-27174
Observations of turbulent spots on a water table
[TULEA-1982-039-T] N83-27176
Experimental investigation of jets in a cross flow — turbulent flow
[KU-SFB-80/E/219] N83-27177
Calculation of turbulence-driven secondary motion in noncircular ducts
[KU-SFB-80/T/220] N83-27178
Turbulence models; a lecture course
[CFD/82/4-REV] N83-27180
Application of a new version of the k-W model of turbulence to equilibrium boundary layer flow over a flat plate with: (1) intense heat transfer and (2) streamwise adverse pressure gradients
[CFD/82/14] N83-27181
Application of a new version of the k-W model of turbulence to a boundary layer with mass transfer
[CFD/82/15] N83-27182
An analysis of the Wyngaard-LeMone model of refractive index and micrometeorological structure functions at the top of a turbulent mixed layer
[AD-A123986] N83-27548
TURBULENT MIXING
Representations of combustion in computer models of spark ignition
[CFD/82/18] N83-26986
On the numerical prediction of vertical turbulent exchange in stratified flows — geophysical flows, saline water
[TULEA-1981-08] N83-27340
TWO DIMENSIONAL FLOW
A note on adaptive wind tunnels with imperfect control N83-26792
Prediction of natural convection flow pattern in low-aspect ratio enclosures
[AD-A124995] N83-27161
On steady vortex flow in two dimensions, 1
[AD-A120965] N83-27162
A mathematical model of the urban boundary layer — atmospheric models
[TULEA-1982-09] N83-27515
Feasibility study of three-dimensional holographic interferometry for aerodynamics
[NASA-CR-166483] N83-27845
TWO PHASE FLOW
Representations of combustion in computer models of spark ignition
[CFD/82/18] N83-26986
Mass flow measurement of solids/gas stream using radiometric techniques
[DE82-017028] N83-27170
Critical flow data review and analysis
[DE82-902199] N83-27172
TWO REFLECTOR ANTENNAS
Scanning beam antenna conceptual design for 20/30 GHz satellite systems N83-26889
Multimission advanced configuration N83-26890
Large space antenna communications systems: Integrated Langley Research Center/Jet Propulsion Laboratory development activities. 2: Langley Research Center activities N83-26892
Large space antenna communications systems: Integrated Langley Research Center/Jet Propulsion Laboratory development activities. 3: Jet Propulsion Laboratory activities N83-26893
The effects of mesh reflecting surfaces upon radiometric measurements N83-26894

U

U.S.S.R.
Technical summary of accomplishments made in preparation for the USSR barley exploratory experiment
[E83-10315] N83-27304
ULTRAHIGH FREQUENCIES
Large spaceborne antenna technology: A system perspective N83-26854
Land mobile satellite system requirements N83-26855
Beam parameter measurements for the SLAC linear collider N83-27753
ULTRASONIC RADIATION
Low-temperature ultrasonic attenuation in rapidly cooled niobium containing oxygen and hydrogen
[DE82-012717] N83-27806
Ultrasonic wave attenuation spectra in steels
[AERE-R-10753] N83-27808
ULTRASONIC TESTS
Use of analytical mechanics in defining acoustic-test methodology
[DE82-016615] N83-27802
Ultrasonic system characterization
[DE82-019210] N83-27804
ULTRASONIC WAVE TRANSDUCERS
Ultrasonic system characterization
[DE82-019210] N83-27804
ULTRASONICS
Nondestructive inspection and evaluation of composite-material flywheels
[DE82-015379] N83-26930
ULTRAVIOLET ABSORPTION
Interstellar proteins and the discovery of a new interstellar absorption feature at lambda = 2800A
[PREPRINT-86] N83-27944
ULTRAVIOLET ASTRONOMY
Interstellar proteins and the discovery of a new interstellar absorption feature at lambda = 2800A
[PREPRINT-86] N83-27944
ULTRAVIOLET RADIATION
USSR report: Life sciences. Effects of nonionizing electromagnetic radiation, no. 9
[JPRS-83601] N83-27572
ULTRAVIOLET SPECTRA
The extinction of starlight at wavelengths near 2200A. The 2.8 to 3.8 micron spectra of micro-organisms with varying H2O-ice content
[PREPRINT-85] N83-27940
UNDERGROUND EXPLOSIONS
The National Seismic Station
[DE82-018224] N83-27527
UNDERWATER ACOUSTICS
Investigations of the 1 KHz sound absorption in sea water
[AD-A124888] N83-27797
Some simple formulae for normal mode wave numbers, cutoff frequencies and the number of modes trapped by a sound channel
[AD-A124948] N83-27798
Sensitivity to sound speed of surface/bottom reflecting transmissions in a deep ocean channel
[AD-A125278] N83-27800
UNDERWATER VEHICLES
Open water experiments on an ROV thruster — Remotely Operated (underwater) Vehicle (ROV)
[NMI-R-143] N83-27212
UNSTEADY FLOW
Some advantages of unsteady aerodynamics N83-26808
Some recent applications of XTRAN3S
[NASA-TM-85641] N83-26815
Finite element approximation of the nonstationary Navier-Stokes problem. Part 2: Stability of solutions and error estimates uniform in time
[PREPRINT-558-PT-2] N83-27179
Calculation of the unsteady flow through relatively moving blade rows and the unsteady blade forces
[PNR-90158] N83-27183
Investigation of the coupling of unsteady lift to low order acoustic duct modes in an axial flow fan
[AD-A124819] N83-27796
UNSTEADY STATE
Unsteady models, vectorial autoregressive models, and Levinson's algorithm
[ENST-D-82005] N83-27676
URANIUM
Geology and mineral resources of the Baltimore 1 deg by 2 deg NTMS quadrangle, Maryland-Pennsylvania-Virginia N83-27328
Geology and mineral resources of the Boston 1 deg by 2 deg NTMS quadrangle, Massachusetts-New Hampshire N83-27329
Geology and mineral resources of the Lake Champlain 1 deg by 2 deg NTMS quadrangle, New Hampshire-New York-Vermont N83-27330
Statistical Techniques Applied to Aerial Radiometric Surveys (STAARS): Application of the Huber M-estimator to aerial radiometric data for the identification of host and source areas for uranium deposits
[DE82-018199] N83-27335
National Uranium Resource Evaluation Program: Supplement to hydrogeochemical and stream sediment reconnaissance basic data reports K/UR-405 and K/UR-406 through K/UR-443 GJBX-88(82)]
[DE82-013774] N83-27336
Beam broadening in a strongly scattering target in the analytical electron micropscope
[DE82-014085] N83-27825
URANIUM COMPOUNDS
Electronic-energy-band structure of uranium hydride
[DE82-016393] N83-27884
URANIUM 238
Preliminary calculations for testing a fission/fusion hybrid blandket module in a fission reactor: Addendum 2
[DE82-015622] N83-27860
URBAN RESEARCH
The classification of LANDSAT data for the Orlando, Florida, urban fringe area
[E83-10327] N83-27311
Effects of autocorrelation upon LANDSAT classification accuracy — Richmond, Virginia and Denver, Colorado
[E83-10328] N83-27312
URBAN TRANSPORTATION
Potential of composite materials in surface transportation applications
[DE83-007218] N83-26931
Demonstration and evaluation of gas turbine transit buses
[NASA-CR-165528] N83-27926
USER MANUALS (COMPUTER PROGRAMS)
Input generator for Denton 3-dimensional turbomachine-blade-row analysis code
[NASA-TM-23324] N83-26817

MARIAH: A finite-element computer program for incompressible porous-flow problems, user's manual
[DE83-006847] N83-27167
User's manual for MODCAL: Bounding surface soil plasticity model calibration and prediction code, volume 2
[AD-A124867] N83-27523
User manual AQUASTOR: A computer model for cost analysis of aquifer thermal-energy storage coupled with district heating or cooling systems. Volume 2: Appendices
[DE82-013889] N83-27631

USER REQUIREMENTS
Large spaceborne antenna technology: A system perspective N83-26854
Status, trends and implications of carbon fiber material use
[PB83-147751] N83-26934
Hydrogen derived from ammonia: Small-scale costs
[DE82-012720] N83-27040
Sandia Micro Generation for Integrated Circuits (SMAGIC) system and the hierarchical artwork (HAT) language
[DE82-009912] N83-27134
Spelling correction in user interfaces
[AD-A125208] N83-27906
Query optimization in distributed databases
[AD-A124921] N83-27909
Documenting content of technical databases
[DE82-017526] N83-27914

UTAH
Low-level radioactive waste disposal. Study of a conceptual nuclear energy center at Green River, Utah
[DE83-006835] N83-27844

UTILITIES
An appraisal of evaluations of utility sponsored programs for residential energy conservation
[RAND-N-1925-DOE] N83-27350
Demonstration of an a-c utility connected wind generator in a urban setting
[DE83-006696] N83-27387
Operations requirements of utilities with wind-power generation
[DE83-007051] N83-27394
Intermediate photovoltaic system application experimental operational performance report for Newman Power Station, El Paso, Texas for September 1982, volume 15
[DE83-006845] N83-27459
Cost/design study and fabrication/testing of a 300-W gas-recombination device for utility lead-acid cells
[DE82-019800] N83-27468

V

V/STOL AIRCRAFT
Advances in ejector technology: A tribute to Hans von Ohain's vision N83-26805
Aircraft aerodynamic prediction method for V/STOL transition including flow separation
[NASA-CR-166467] N83-26818

VACUUM
Anode phenomena in vacuum arcs
[DE83-007181] N83-27141

VACUUM APPARATUS
Vacuum roll coating equipment N83-27369

VALLEYS
New pollutant dispersion model for application in mountain valleys
[DE83-005289] N83-27509

VALVES
Hardfacing materials and processes for valve applications N83-27221

VANADIUM ALLOYS
Experimental characterization of the flux-line lattice in superconducting V3Si
[DE83-004647] N83-27688

VANES
An analytical solution for the electrical properties of a Radio Frequency Quadrupole (RFQ) with simple vanes N83-27785
An RFQ linac for heavy ion acceleration N83-27787
A 750 keV RFQ linac for the AGS polarized proton program N83-27788
Buncher section optimization of heavy ion RFQ linacs N83-27790

VAPOR DEPOSITION
Sintering phenomena of non-oxide silicon compounds
[DE83-007332] N83-26932
Continuous cable processing by the physical vapor deposition technique
[DE83-006011] N83-27003
Optical coatings by conveyorized atmospheric Chemical Vapor Deposition (CVD) N83-27368

VAPOR PHASES
High-resolution stimulated Raman spectroscopy
[DE82-013490] N83-26956
Pulverized fuel and scaleup methodologies
[DE82-014822] N83-26962
Electron emission characteristics of tungsten alloys: Mee 492 — for use in thermionic converters
[DE83-006774] N83-27006

VAPOR PRESSURE
Thermodynamics of organic compounds
[AD-A125022] N83-27695

VAPORIZERS
Particle analyzing method and apparatus
[NASA-CASE-NPO-15292-1] N83-27184

VAPORIZING
Addition of devolatilization equations to SYNTHANE computerized mathematical model
[DE83-006243] N83-27444

VARIABLE PITCH PROPELLERS
Open water experiments on an ROV thruster — Remotely Operated (underwater) Vehicle (ROV)
[NMI-R-143] N83-27212

VARIANCE (STATISTICS)
Selecting band combinations with thematic mapper data
[E83-10303] N83-27294

VARIATIONS
Variable energy standing wave linear accelerator structure N83-27765

VAX-11/780 COMPUTER
Efficiency considerations for C programs on a VAX (trademark) 11/780
[AD-A125209] N83-27617
Development of computer performance evaluation tools for VAX-11/780 computers
[AD-A124904] N83-27619

VECTORS (MATHEMATICS)
Unsteady models, vectorial autoregressive models, and Levinson's algorithm
[ENST-D-82005] N83-27676

VEGETABLES
Radionuclide fate and effects N83-27486

VEGETATION
Evaluation of ground cover and land use in the PDRI-AM remote sensing technique program area — Brazil
[E83-10230] N83-27283
Monitoring tropical vegetation succession with LANDSAT data
[E83-10306] N83-27296
Monitoring land degradation in southern Tunisia: A test of LANDSAT imagery and digital data
[E83-10320] N83-27308
Remote Sensing techniques used to characterize soil erosion in southwestern Sao Paulo state — Brazil
[E83-10339] N83-27315
Satellite monitoring of vegetation and geology in semi-arid environments — Tanzania
[E83-10343] N83-27318

VEGETATIVE INDEX
Atmospheric effects on METSAT data
[E83-10314] N83-27303
Study to assess the importance of errors introduced by applying NOAA 6 and NOAA 7 AVHRR data as an estimator of vegetative vigor: Feasibility study of data normalization
[E83-10346] N83-27321

VELOCITY
Development of variable-shaft-speed alternator
[DE82-012334] N83-27139

VELOCITY DISTRIBUTION
Experimental investigation of the mixing of highly swirling flows
[AD-A125249] N83-27160
Effective charge of low-velocity nitrogen, neon and argon ions in carbon, aluminum and gold N83-27716

VERMONT
Geology and mineral resources of the Lake Champlain 1 deg by 2 deg NTMS quadrangle, New Hampshire-New York-Vermont N83-27330

VERTICAL DISTRIBUTION
Concrete construction using slipform techniques
[AD-A124923] N83-27059
Report on the West Sole Wind Structure Project 1982 — wind profiles at a North Sea offshore platform
[NMI-R-145] N83-27535

VERTICAL ORIENTATION
Investigation of a third order baro-damped verticle channel of INS
[AD-A124882] N83-26828

VERY HIGH FREQUENCIES
Use of the VHF signal of the Sirio satellite for ionospheric investigations N83-27533

VERY LONG BASE INTERFEROMETRY
Large Space Antenna Systems Technology, part 1
[NASA-CP-2269-PT-1] N83-26853
Antenna technology for orbital Very Long Baseline Interferometry (VLBI) N83-26859

VIBRATION DAMPING
Influence of damping on the transverse displacement of an impact-loaded column with two degrees of freedom
[TULEA-1981-06-T] N83-27271

VIBRATION EFFECTS
Analysis of STS-3 Get Away Special (GAS) flight data and vibration specification for gas payloads
[NASA-TM-85000] N83-26911

VIBRATION TESTS
Experimental investigation of a mechanical impedance gauge based on measurement of strains on a conical rod
[TULEA-1981-06-T] N83-27272
Response of the cardiovascular system to vibration and combined stresses
[AD-A125225] N83-27583

VIBRATIONAL STRESS
Influence of damping on the transverse displacement of an impact-loaded column with two degrees of freedom
[TULEA-1981-06-T] N83-27271
Response of the cardiovascular system to vibration and combined stresses
[AD-A125225] N83-27583

VIDEO DATA
Automatic threshold design for a bound document scanner
[AD-A125316] N83-27913

VIDEO EQUIPMENT
The VDU operators' preferred environmental conditions in a telephone information center — video display device luminance
[TULEA-1982-11] N83-27603

VIEW EFFECTS
METCOR4: A program to simulate METSAT data
[E83-10313] N83-27302

VIRGINIA
Geology and mineral resources of the Baltimore 1 deg by 2 deg NTMS quadrangle, Maryland-Pennsylvania-Virginia N83-27328

VISCOELASTICITY
Multiaxial creep of 2618 aluminum under proportional loading steps
[AD-A125023] N83-26997

VISCOPLASTICITY
Elongational viscosity rheological parameter study
[AD-A125265] N83-27261

VISCOSITY
The energy balance in axisymmetric steady compressible swirl flows with closed streamlines N83-26789
Thermophysical properties of coal liquids
[DE82-013366] N83-26967
Linearized stability of extreme shock profiles for systems of conservation laws with viscosity
[AD-A125256] N83-27159
Prediction of natural convection flow pattern in low-aspect ratio enclosures
[AD-A124995] N83-27161

VISCOUS FLOW
On Synge's criterion for the stability of plane Couette flow N83-26802

VISCOUS FLUIDS
Elongational viscosity rheological parameter study
[AD-A125265] N83-27261

VISUAL PERCEPTION
Research and analysis of head-directed area-of-interest visual system concepts
[NASA-CR-166480] N83-26849
A model for human visual processing which explains perceptions of motion-after-effects
[AD-A124842] N83-27588
The role of convergence in stereoscopic depth constancy
[AD-A124231] N83-27590
Components of mental imagery representation
[AD-A124616] N83-27591

VOICE COMMUNICATION
Land mobile satellite system requirements N83-26855
Audio direct broadcast satellites N83-26857

VOICE DATA PROCESSING
Analysis of representative parameters grouping for the evaluation of voice signal automatic speaker recognition methods
[FUB-14-1982] N83-27115

VOIDS
Kinetics of void formation in strained metals
[ISSN-0208-5658] N83-26993

VOLATILITY
A method for determining liquid volatility at ambient temperatures using an infrared gas analyzer
[AD-A124906] N83-26940

Conference on Planetary Volatiles
[NASA-CR-172682] N83-27938
VOLT-AMPERE CHARACTERISTICS
Concentration solar-cell flash tester
[DE82-018551] N83-27195
VOLUME
Effect of confining pressure on pore volume in tight sandstones
[DE82-013573] N83-27524
Figure-of-merit analysis and cost effectiveness of low-level radioactive waste treatment systems
[DE82-018890] N83-27838
VORTEX GENERATORS
Flat-plate drag measurements with vortex generators in turbulent boundary layer
[NASA-CR-172125] N83-26814
VORTEX SHEETS
A note on the oscillation of cavities coupled to aerodynamic flows N83-26795
VORTICES
Flat-plate drag measurements with vortex generators in turbulent boundary layer
[NASA-CR-172125] N83-26814
Experimental study of strength and existance domain of ground-to-air inlet vortices by ground board static pressure measurements
[PB83-144865] N83-26843
Experimental investigation of the mixing of highly swirling flows
[AD-A125249] N83-27160
On steady vortex flow in two dimensions, 1
[AD-A120965] N83-27162
On steady vortex flow in two dimensions, 2
[AD-A120966] N83-27163

W

WAFERS
Quantitative analysis of phosphosilicate glass films on silicon wafers
[DE82-017642] N83-26953
WALL FLOW
Flat-plate drag measurements with vortex generators in turbulent boundary layer
[NASA-CR-172125] N83-26814
WALL TEMPERATURE
Curved film cooling admission tube
[NASA-CASE-LEW-13174-1] N83-27144
Heat transfer/boundary layer investigation of heating discrepancies in wind tunnel testing of orbiter insulating articles
[AD-A124803] N83-27893
WALLS
Phase-change materials in masonry construction
[DE83-007227] N83-27061
Prediction of the seismic responses of R/C frame-coupled wall structures
[PB83-149203] N83-27083
Research on wall turbulence
[AD-A124831] N83-27153
Economic analysis of the integrated heating and cooling potential of a residential passive-solar water wall design
[DE82-018372] N83-27419
WARNING SYSTEMS
Sandia Helicopter Acoustic Detector (SHAD)
[DE82-018925] N83-27803
WASTE DISPOSAL
Laboratory simulation of a deep-ocean in-situ heat-transfer experiment
[DE82-018656] N83-27171
Waste-to-energy compendium: Revised 1982 edition
[DE82-020328] N83-27471
Radionuclide fate and effects N83-27486
Statistical and theoretical research N83-27487
Meteorological Effects of Thermal Energy Releases (METER) program
[DE83-006313] N83-27502
Urban-waste program research and development 1978-1981: An overview
[DE82-019788] N83-27514
Acoustic emissions during deformation of intact and jointed welded tuff
[DE82-018346] N83-27805
Incinerator development program for processing transuranic waste at the Idaho National Engineering Laboratory
[DE82-017265] N83-27839
Low-level radioactive waste disposal. Study of a conceptual nuclear energy center at Green River, Utah
[DE83-006835] N83-27844
WASTE ENERGY UTILIZATION
Waste-to-energy compendium: Revised 1982 edition
[DE82-020328] N83-27471
WASTE TREATMENT
Organic solvent regeneration of granular activated carbon
[PB83-150201] N83-27078
Plating wastes survey
[AD-A125230] N83-27480
Urban-waste program research and development 1978-1981: An overview
[DE82-019788] N83-27514
Figure-of-merit analysis and cost effectiveness of low-level radioactive waste treatment systems
[DE82-018890] N83-27838
WASTE WATER
Engineering analysis of potential photosynthetic bacterial hydrogen-production systems
[DE82-019151] N83-27414
Plating wastes survey
[AD-A125230] N83-27480
Urban-waste program research and development 1978-1981: An overview
[DE82-019788] N83-27514
WATER
Thermochemical processes for solar hydrogen production
[DE82-019575] N83-27047
Assessment of water addition to spark ignition engines
[DE83-006013] N83-27245
Economic analysis of the integrated heating and cooling potential of a residential passive-solar water wall design
[DE82-018372] N83-27419
Photosynthetic water splitting
[DE82-017315] N83-27429
A linearized, time dependent model of the heat transfer and thermoregulatory responses occurring upon immersion in cold water
[AD-A124972] N83-27586
WATER CONSUMPTION
Assessing solar energy and water use efficiencies in winter wheat
[E83-10329] N83-27313
WATER CURRENTS
A turbulence model for depth-averaged equations of motion --- water currents
[TULEA-1981-07] N83-27174
WATER FLOW
Flash evaporation from turbulent water jets
[DE83-007311] N83-27168
Dynamics of three-dimensional disturbances in water table flow --- water waves
[TULEA-1982-36-T] N83-27175
WATER HEATING
Solar project description: South Bridge Towers no. 6 multi-family cooperative, New York City, New York
[DE82-019252] N83-27421
Intermediate photovoltaic system application experiment operational performance report, for April 1982. Volume 2: For Mississippi County Community College, Blytheville, Arkansas
[DE83-006446] N83-27439
Intermediate photovoltaic system application experiment operational performance report, for September 1982. Volume 5: For Oklahoma Center for Science and Arts
[DE83-006448] N83-27440
Intermediate photovoltaic system application experiment operational performance report, for October 1982. Volume 16: For Lovington Square Shopping Center, Lovington, New Mexico
[DE83-006447] N83-27441
Intermediate photovoltaic system application experiment operational performance report. Volume 16: For Newman Power Station, El Paso, Texas for October 1982
[DE83-006445] N83-27442
Analysis of field-test data from domestic solar-water heaters in the southern United States
[DE83-006822] N83-27455
WATER IMMERSION
Nuclear reactor system study for NASA/JPL
[NASA-CR-172631] N83-27836
Space reactors
[DE82-019187] N83-27837
WATER POLLUTION
Large-scale operations management test of use of the White Amur for control of problem aquatic plants. Part 4. Third year poststocking results. Volume 6. The water and sediment quality of Lake Conway, Florida
[AD-A124443] N83-27479
Solid wastes: Mobilization, fate and effects N83-27485
WATER QUALITY
Rapid, quantitative determination of bacteria in water --- adenosine triphosphate
[NASA-CASE-GSC-12158-1] N83-27569
WATER RESOURCES
Assessment of water use impacts from solar-energy development
[DE83-004888] N83-27448
WATER RUNOFF
State space models of the Nash cascade: Kinematic and diffusion waves --- dynamic hydrology systems
[TULEA-1981-14] N83-27341
WATER TABLES
Dynamics of three-dimensional disturbances in water table flow --- water waves
[TULEA-1982-36-T] N83-27175
Observations of turbulent spots on a water table
[TULEA-1982-039-T] N83-27176
WATER TEMPERATURE
Long term upper ocean study (LOTUS): A summary of the historical data and engineering test data
[AD-A124362] N83-27559
WATER VAPOR
Beer's-law-based, simple spectral model for direct normal and diffuse horizontal irradiance
[DE83-008132] N83-27526
Current stopping power analyses N83-27701
WATER WAVES
Observation and measurement of air flow over water waves
[NMI-R-122] N83-27145
Mean wave drift forces: Theory and experiment --- water waves
[NMI-R-124] N83-27146
Interference effects on the drag loading for groups of cylinders in uni-directional flow --- water waves, offshore structures
[NMI-R-130] N83-27147
Dynamics of three-dimensional disturbances in water table flow --- water waves
[TULEA-1982-36-T] N83-27175
Phase variation in wave force data --- offshore structures
[NMI-R-132] N83-27253
Wave forces on circular cylinders with large excrescences at low Keulegan and Carpenter numbers --- water waves
[NMI-R-133] N83-27254
A comparison of two methods for calculating wave drift forces --- water waves, offshore structures
[NMI-R-137] N83-27255
Prediction of nearshore wave transformation
[AD-A125104] N83-27561
WAVE ATTENUATION
Ultrasonic wave attenuation spectra in steels
[AERE-R-10753] N83-27808
WAVE DIFFRACTION
Mean wave drift forces: Theory and experiment --- water waves
[NMI-R-124] N83-27146
WAVE DISPERSION
Ray tracing in dissipative media
[KGI-PREPRINT-060] N83-27112
WAVE EQUATIONS
Lax-Wendroff methods for hyperbolic history value problems
[AD-A125283] N83-27649
WAVE FUNCTIONS
Perturbed stationary-state description of the polarization effect in innershell ionization N83-27705
WAVE PACKETS
Ray tracing in dissipative media
[KGI-PREPRINT-060] N83-27112
WAVE PROPAGATION
Compound-compressible nozzle flow N83-26790
Three-dimensional wave propagation using boundary integral equation techniques
[AD-A124956] N83-27103
Comparison of the initial ETA gas-propagation experiments with theoretical models
[DE82-015415] N83-27843
WAVE REFLECTION
Sensitivity to sound speed of surface/bottom reflecting transmissions in a deep ocean channel
[AD-A125278] N83-27800
WAVE SCATTERING
The Bojarski-Lewis identify for elastic wave scattering N83-26809
WAVEFORMS
Shock-wave response of titanium sunhydride-potassium perchlorate
[DE82-016739] N83-27043
Experimental investigation of the mixing of highly swirling flows
[AD-A125249] N83-27160
Comparison of the initial ETA gas-propagation experiments with theoretical models
[DE82-015415] N83-27843
WAVEGUIDES
Waveguide cooling system
[NASA-CASE-NPO-15401-1] N83-27085

WEAK INTERACTIONS (FIELD THEORY)
The Gamow-Teller strength functions and neutrino problems
[DE82-018357] N83-27828
WEAPONS DEVELOPMENT
Shock-wave response of titanium sunhydride-potassium perchlorate
[DE82-016739] N83-27043
WEAR
NASA interdisciplinary collaboration in tribology. A review of oxidational wear
[NASA-CR-3686] N83-27021
WEAR INHIBITORS
Hardfacing materials and processes for valve applications N83-27221
WEATHER
Simulating soybean canopy temperature as affected by weather variables and soil water potential
[E83-10319] N83-27307
Cross correlation analysis to determine the environmental parameters correlated with electro-optical system performance
[AD-A124886] N83-27544
WEATHER FORECASTING
Revised Uniform Summary of Surface Weather Observations (RUSSWO)
[AD-A122719] N83-27543
SoutHern Hemisphere application of the Navy nested tropical cyclone model
[AD-A125011] N83-27545
Numerical simulation of the influence of small scale mountain ranges on a baroclinic wave
[AD-A125301] N83-27546
Terminal forecast reference notebook for Rhein Main AB, Germany
[AD-A124984] N83-27547
Terminal forecast reference notebook for Grafenwoehr AAF, Germany
[AD-A125038] N83-27549
Terminal forecast reference notebook for Heidelberg AB, Germany
[AD-A125037] N83-27550
WEBS (SHEETS)
Large-area sheet task: Advanced dendritic-eb-growth development
[NASA-CR-172683] N83-27353
Process research on non-CZ silicon material
[NASA-CR-172684] N83-27381
WEIGHTING FUNCTIONS
Extension of interpolation theorems for weighted Sobolev spaces
[CTH-MATH-1983-2] N83-27673
WEIGHTLESSNESS
Manned assembly of space structures N83-26869
WELD STRENGTH
International Conference on Welding Technology for Energy Applications
[DE83-006404] N83-27215
High temperature properties of the seam weld portion in 1% Cr-0.5% Mo ERW boiler tubing after long-term aging N83-27223
WELDABILITY
Weld penetration variation in GTA welding of some 304 L stainless steels N83-27222
WELDED JOINTS
Aging response of a welded iron-based superalloy
[DE83-005856] N83-27005
International Conference on Welding Technology for Energy Applications
[DE83-006404] N83-27215
Welding technology for energy conversion N83-27216
Welding practices in fossil-fired units N83-27219
Weld penetration variation in GTA welding of some 304 L stainless steels N83-27222
High temperature properties of the seam weld portion in 1% Cr-0.5% Mo ERW boiler tubing after long-term aging N83-27223
Substructure of a 16-8-2 GTA weld as observed through TEM N83-27224
Creep deformation and crack growth in a low alloy steel welded pressure vessel containing defects N83-27225
Improvement of fusion welding through modelling, measurement and real-time control N83-27226
Laser welding of structural alloys N83-27228
Electron beam welding for heavy section steel plates N83-27229
Creep characteristics of butt welded joints for thick 2 1/4Cr-1Mo pipework and pressure vessels N83-27233
Effect of joint design and fabrication limitations on tube-to-tubesheet welding N83-27235
Welding equipment and process development for inaccessible tube-to-tubesheet welding on a sodium-heated steam generator N83-27236
Creep rupture and creep crack growth behaviour of transition joints N83-27237
Damage accumulation and failure criteria in 'creep brittle' ferritic weldment structures N83-27238
Dissimilar weld failure analysis and development program N83-27239
Some observations on the physical metallurgy of nickel alloy weld metals N83-27240
WELDED STRUCTURES
International Conference on Welding Technology for Energy Applications
[DE83-006404] N83-27215
Welding practices in fossil-fired units N83-27219
Processes quality assurance and examination of weld metal overlays N83-27220
WELDING
International Conference on Welding Technology for Energy Applications
[DE83-006404] N83-27215
The welding metallurgy of SA508 C1 II heat affected zones N83-27230
Creep rupture and creep crack growth behaviour of transition joints N83-27237
WELLS
Data base for hydraulically stimulated gas wells producing from tight sands formations
[DE82-013029] N83-27332
Assessment of the geothermal resources of Kansas
[DE83-003216] N83-27338
Proceedings of the Sixth Annual Geothermal Conference and Workshop
[DE83-901135] N83-27372
Utility geothermal plans, Texas and Louisiana N83-27373
Wellhead power production with a rotary separator turbine (RP 1196) N83-27376
Geo energy research and development: Technology transfer update
[DE83-007225] N83-27395
WEST GERMANY
Terminal forecast reference notebook for Rhein Main AB, Germany
[AD-A124984] N83-27547
Terminal forecast reference notebook for Heidelberg AB, Germany
[AD-A125037] N83-27550
WETTABILITY
Sintering phenomena of non-oxide silicon compounds
[DE83-007332] N83-26932
WHEAT
Technical summary of accomplishments made in preparation for the USSR barley exploratory experiment
[E83-10315] N83-27304
Australia ground data collection 1981-82 crop year, appendixes A and B, volume 2
[E83-10316] N83-27305
Australia ground data collection 1981-82 crop year, volume 1
[E83-10317] N83-27306
Assessing solar energy and water use efficiencies in winter wheat
[E83-10329] N83-27313
Evaluation of trends in wheat yield models
[E83-10349] N83-27324
WILDERNESS
Wildland inventory and resource modeling for Douglas and Carson City Counties, Nevada, using LANDSAT and digital terrain data
[E83-10302] N83-27293
WIND PROFILES
Operations requirements of utilities with wind-power generation
[DE83-007051] N83-27394
Report on the West Sole Wind Structure Project 1982 — wind profiles at a North Sea offshore platform
[NMI-R-145] N83-27535
WIND TUNNEL TESTS
Constant parameter two component channel flows N83-26797
Wind tunnel investigation of separated flow over an afterbody in supersonic axisymmetric stream utilizing one-component laser-Doppler-velocimetry
[FFA-TN-1983-10] N83-26826
Experimental study of strength and existance domain of ground-to-air inlet vortices by ground board static pressure measurements
[PB83-144865] N83-26843
Experimental results of pitching moment tests on parabolic-trough solar-collector array configurations
[DE83-006027] N83-27446
Low flight speed acoustic results for a supersonic inlet with auxiliary inlet doors
[NASA-TM-83411] N83-27794
Heat transfer/boundary layer investigation of heating discrepancies in wind tunnel testing of orbiter insulating articles
[AD-A124803] N83-27893
WIND TUNNELS
A note on adaptive wind tunnels with imperfect control N83-26792
WIND TURBINES
A new look at turbulence experienced by a rotating wind turbine
[DE83-007044] N83-27383
Wind-systems technical notes: 1981
[DE83-007202] N83-27384
Demonstration of an a-c utility connected wind generator in a urban setting
[DE83-006696] N83-27387
Siting guidelines for utility application of wind turbines
[DE83-007428] N83-27393
Operations requirements of utilities with wind-power generation
[DE83-007051] N83-27394
Research results for the tornado wind-energy system: Analysis and conclusions
[DE83-006091] N83-27443
Technical and management support for the development of small wind systems
[DE83-007197] N83-27461
Aerodynamic research on Tipvane windturbines
[PB83-147413] N83-27476
WIND VANES
Aerodynamic research on Tipvane windturbines
[PB83-147413] N83-27476
WIND VELOCITY
Operations requirements of utilities with wind-power generation
[DE83-007051] N83-27394
Kahuku kite wind study. 2: Kahuku foothills
[DE83-006402] N83-27554
WINDMILLS (WINDPOWERED MACHINES)
Demonstration of an a-c utility connected wind generator in a urban setting
[DE83-006696] N83-27387
WINDPOWER UTILIZATION
Operations requirements of utilities with wind-power generation
[DE83-007051] N83-27394
Research results for the tornado wind-energy system: Analysis and conclusions
[DE83-006091] N83-27443
Technical and management support for the development of small wind systems
[DE83-007197] N83-27461
WINGS
Analysis of progressive collapse of complex structures
[AD-A125266] N83-27260
WOOD
Flash pyrolysis and hydropyrolysis of biomass
[DE82-015807] N83-26951
Hydropyrolysis of biomass and related materials for the production of liquids
[DE82-012928] N83-27402
Biomass-energy-technology program summary
[DE82-018926] N83-27426
WORDS (LANGUAGE)
Towards very large vocabulary word recognition
[AD-A125224] N83-27094
WORKING FLUIDS
Concept evaluation of automotive propulsion using liquid air/nitrogen
[DE82-016992] N83-27927
WRINKLING
A calculation of wrinkled flames
[AD-A125258] N83-26943

X

X RAY ABSORPTION
Passive films, surface structure and stress corrosion and crevice corrosion susceptibility
[AD-A124879] N83-26995
X RAY FLUORESCENCE
A novel general purpose computer correction procedure for quantitative X-ray fluorescence analysis
[LGC-1/1982] N83-26987
X RAY SPECTROSCOPY
Technique and applications of X-ray photoelectron spectroscopy
[AERE-R-10803] N83-26388
X RAYS
Place of HgI2 energy-dispersive X-ray detectors
[DE82-017651] N83-27193
Electron-positron annihilation and the cosmic X-ray background N83-27935

Y

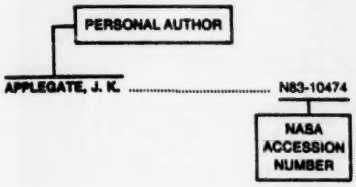
YAW
Heating measurements on Space Shuttle Orbiter models with differentially deflected elevons
[NASA-TM-84646] N83-27151
YIELD
Evaluation of trends in wheat yield models
[E83-10349] N83-27324
Yield forecasting from remote sensing data: A survey of methods available in 1982 --- crop yield
[REPT-M/83/5] N83-27343
YIELD STRENGTH
Use of microhardness to determine the strengthening and microstructural alterations of 14-MeV-neutron-irradiated metals
[DE82-014002] N83-27000
Analysis of elevated-temperature tensile and creep properties of normalized and tempered 2-1/4 Cr-1 Mo steel
[DE82-018160] N83-27010

Z

ZEOLITES
New catalysts for the indirect liquefaction of coal
[DE82-017190] N83-26971
ZETA PINCH
Recent results on the dense Z-pinch
[DE82-015802] N83-27859
Stability and confinement of spheromaks and field-reversed configurations
[DE82-018378] N83-27862
ZINC
H2S removal from coal gas at mid temperature (150 to 200 deg C)
[DE82-011004] N83-26963
ZIRCONIUM ALLOYS
The beneficial effect of zirconium and calcium when jointly microalloyed with high speed steels
[BLL-M-26914-(5828.4)] N83-26992
ZIRCONIUM CARBIDES
Zirconium carbide as an electrocatalyst for the chromous-chromic redox couple
[NASA-CASE-LEW-13246-1] N83-27344
ZIRCONIUM COMPOUNDS
Ion-exchange behavior of alkali metals on treated carbons
[DE83-005980] N83-27835

PERSONAL AUTHOR INDEX

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The NASA accession number denotes the number by which the citation is identified.

A

ABBASY, I. N83-26844
ABDOLLAHIAN, D. N83-27172
ABRAHAM, J. N83-27511
ABRAHAM, M. M. N83-27026
ABRAHAM, R. T. N83-27102
ACHEN, C. F. N83-27693
ADAMS, B. A. N83-27385
ADLER, R. J. N83-27777
AEBY, I. N83-27850
AGRELL, J. N83-26826
AKASOFU, S. I. N83-27516
AKIN, D. N83-26869
AKTAN, A. E. N83-27083
ALBERRY, P. J. N83-27230
ALESSANDRINI, F. N83-27252
ALEXANDER, W. A. N83-27499
ALLEN, J. L. N83-26904
ALLEN, L. J. N83-27737
ALLEN, R. D. N83-27465
ALLWINE, K. J. N83-27509
ALMASSY, R. J. N83-26832
ALPERIN, M. N83-26803
ALTMAN, W. G., JR. N83-27081
AMADO, C. N83-27686
AMOS, A. K. N83-26870
AMOS, C. N83-27172
ANAMI, S. N83-27761
ANDERSEN, K. E. N83-27286
ANDERSON, J. N83-27063
ANDERSON, J. D., JR. N83-26796
ANDERSON, M. N83-27031
ANDERSON, R. L. N83-27192
ANDERSON, S. B. N83-26846
ANDERSON, W. J. N83-27214
ANDREOPOULOUS, J. N83-27177
ANDREWS, H. R. N83-27711
ANGELL, G. R. N83-27026
ANGERT, N. N83-27727
ANLIKER, D. M. N83-27391
ANSON, D. N83-27436
ANTIPOV, V. V. N83-27574
ANTOMONOV, M. Y. N83-27575
ANTONELLI, M. N83-27925
APSEL, R. J. N83-27103
ARAI, S. N83-27787
ARCHIBALD, T. C. N83-27024
AREN, B. N83-27012
N83-27013
ARLOWE, H. D. N83-27803
ARMIJO, J. R. N83-27463
ARON, J. N83-27730
ARON, P. R. N83-27020
ARTHUR, A. N83-27109
ASCHMANN, S. M. N83-27035
ASHLEY, J. C. N83-27713
ASO, Y. N83-27853
ASRAR, G. N83-27313
ATKINSON, R. N83-27035
AUBLE, R. L. N83-27815
AUBRUN, J. N. N83-26884
AUFHAUS, H. N83-27729
N83-27781
AWERBUCH, L. N83-27377
N83-27378
AZIZINAMINI, A. N83-27081

B

BABU, S. P. N83-27401
BABUSKA, I. N83-27660
N83-27661
BACKLUND, B. N83-27142
BADGER, P. C. N83-27049
BADO, P. N83-26941
BAILEY, M. C. N83-26892
BAILEY, M. J. N83-27060
BAILEY, R. E. N83-26835
BAILEY, W. F. N83-26810
BAILLIEUL, J. N83-26883
BAJURA, R. A. N83-27062
N83-27505
BAKER, D. N. N83-27946
BALCH, D. T. N83-26820
BALL, D. A. N83-27436
BALL, D. E. N83-27086
BALL, J. B. N83-27815
BANIN, A. N83-27947
BANKS, H. T. N83-27696
BANNEROT, R. B. N83-27445
BAQUE, P. N83-26989
BARG, D. N83-27844
BARNES, D. E. N83-27242
BARNES, M. J. N83-27599
BARNES, R. G. N83-26979
BARTON, J. S. N83-27193
BARTON, S. A. N83-26996
BASBAS, G. N83-27705
N83-27714
BASHARKHAH, M. A. N83-27080
N83-27082
BASSIOUNI, Z. N83-27473
BATORY, D. S. N83-27917
BAUDOIN, A. N83-27477
BAUM, K. N83-27024
BEAUDRY, B. J. N83-27396
BEBOUT, D. G. N83-27473
BECK, D. R. N83-27880
BECK, F. B. N83-26892
BECKER, F. L. N83-27804
BECKMAN, R. J. N83-27335
BEENE, J. R. N83-27817
BEHL, W. K. N83-26942
BELHOUI, M. N83-26979
BELL, Z. W. N83-27627
BELLAZZINI, R. N83-27571
BELOFF, W. R. N83-27188
BEMENT, T. R. N83-27335
BEMIS, C. E., JR. N83-27817
BEN-DAVID, S. N83-27419
BENAROYA, R. N83-27730
BENDER, G. L. N83-27263
BENJAMIN, H. N83-27387
BENNETT, R. M. N83-26815
BENSON, R. F. N83-27516
N83-27517
BENTLEY, J. L. N83-27617
BENTSEN, I. D. N83-27026
BEREMAND, D. G. N83-27924
BERENS, P. H. N83-26941
BERGAMINI, E. W. N83-27087
N83-27088
BERGER, M. J. N83-27703
BERGH, U. N83-27598
BERGSMA, J. P. N83-26941
BERMAN, S. M. N83-27104
BERNARD, S. N83-27542
BERNSTEIN, A. N83-26790
BERRETTA, G. N83-26890
BERRY, S. H. N83-27349
BERTERO, V. V. N83-27083
BESEN, S. M. N83-27922
BESSENDORF, M. N83-27256
BETTI, G. N83-27571
BHAGAT, P. K. N83-27578
BHARATHAN, D. N83-27166
BIANCHI, F. N83-27115
N83-27116
N83-27117
N83-27123
BIERENBAUM, H. S. N83-27066
BIERSACK, J. P. N83-27710
BILAZARARIAN, P. N83-27800
BIRD, R. E. N83-27526
BIRGERSSON, M. N83-27630
BIRNBAUM, H. K. N83-27606
BISHOP, C. A. N83-27371
BISSONNETTE, R. N83-27761
BJERSACK, J. P. N83-27706
BJORKEN, J. D. N83-27822
BLACKHAM, A. O. N83-26972
BLACKWELDER, R. N83-27153
BLEWETT, P. J. N83-26976
BLOCKER, C. N83-27753
BLOOMFIELD, D. N83-27464
BODLE, W. W. N83-27402
BOEHM, F. N83-27612
BOEHNE, D. N83-27727
BOEKEMA, C. N83-27834
BOGAR, T. J. N83-27157
BOHMAN, R. H. N83-27065
BOICOURT, G. P. N83-27732
BOLLINGER, L. M. N83-27730
N83-27760
BONGARDT, K. N83-27757
N83-27759
BONNET, C. N83-27251
BOOKER, B. L. P. N83-27010
BOOKER, M. K. N83-27010
BOOKER, R. H. N83-27864
BORIBOND, A. N83-27147
BORIBOND, L. A. N83-27254
BOUDREAU, R. A. N83-26968
BOWDEN, M. N83-26869
BOWEY, R. E. N83-27804
BOWMAN, A. L. N83-27052
BOWMAN, M. G. N83-27047
BOYD, D. M. N83-26930
BOYD, J. N83-27479
BOYD, T. J., JR. N83-27764
BOZBIK, I. N83-27751
BRABERS, V. A. M. N83-27834
BRADBURN, J. H. N83-27081
BRADEN, J. A. N83-26822
BRADLEY, O. D. N83-27601
BRAEND-PERSSON, A. N83-27598
BRAMER, J. R. N83-27034
BRAND, J. C. N83-26895
BRANDL, D. N83-27520
BRANDOW, B. N83-27665
BRANDT, W. N83-27715
N83-27716
BRASS, J. A. N83-27293
BREAKWELL, J. A. N83-26884
BREIDENBACH, M. N83-27753
BRENDLING, W. J. N83-27255
BRICE, D. K. N83-27814
BRIGGS, R. J. N83-27842
BRISCOE, M. G. N83-27559
BRISTOW, D. R. N83-26818
BRODOWSKI, J. N83-27748
BROWN, D. R. N83-27382
N83-27631
BROWN, G. P. N83-27621
BROWN, J. C. N83-27726
N83-27736
N83-27740
N83-27762
BROWN, S. C. N83-26845
BRUGIA, O. N83-27120
N83-27121
N83-27122
N83-27124
BRUNEAU, F. N83-27663
BRUNN, J. L. N83-27591
BRUNO, F. M. N83-27131

BRYSON, M. C. N83-27688
BUCHANAN, H. J. N83-26886
BUCKE, D. P. N83-27330
BUCKMAN, M. A. N83-27026
BUENO, A. M. T. R. N83-27281
N83-27282
N83-27314
BURCH, D. W. N83-27049
BURCH, J. L. N83-27519
BURKE, D. L. N83-27813
BURNS, C. E. N83-27513
BURNS, M. L. N83-27929
N83-27930
BUSCH, G. E. N83-27206
BUSH, H. G. N83-26868
BUSH, J. A. N83-27792
BUSSE, L. J. N83-27804
BUTLER, M. K. N83-27630
BUZZELL, W. A. N83-26798

C

CADOU, C. F. X. N83-27403
CAGLIOSTRO, D. J. N83-26978
CAI, B. C. N83-27891
CALDER, M. N83-27593
CAMBELL, T. G. N83-26892
CAMERON, J. M. N83-26885
CAMILLI, P. P. G. N83-27089
CAMILLO, P. N83-27317
CAMPANINI, G. N83-27120
N83-27122
CAMPBELL, C. W. N83-27679
CAMPBELL, M. M. N83-27777
CAMPBELL, T. G. N83-26891
CAMPBELL, W. D. N83-27604
CANE, B. J. N83-27238
CANRIGHT, G. S. N83-27192
CAPANNINI, E. N83-27533
CAPONE, F. J. N83-26821
N83-26823
CAPPELANO, P. T. N83-27893
CARBARY, J. F. N83-27946
CARD, D. H. N83-27844
CARLING, R. T. N83-27621
CARMICHAEL, D. C. N83-27435
CARNUTH, W. N83-27847
CARPENTER, K. H. N83-27864
CARR, L. W. N83-27148
CARRUTH, M. R., JR. N83-26903
CARTER, B. R. N83-27059
CARTER, K. N83-27601
CARTER, R. L. N83-27588
CARTER, T. J., III N83-26830
CARTER, W. P. L. N83-27035
CARVER, D. R. N83-27473
CASAGRANDE, C. N83-27567
CASCIA, V. E. N83-26888
CASH, R. N83-27254
CASH, R. F. N83-27147
CASSADY, M. J. N83-27079
CASSTEVENS, B. J. N83-27915
CASTLE, J. A. N83-27435
CAULFIELD, M. F. N83-26888
CAVALCANTI, I. F. A. N83-27539
CAVE, K. R. N83-27501
CEBECI, T. N83-27148
CEDERWALL, K. N83-27273
CERINI, D. J. N83-27376
CHAMBERS, F. W. N83-27843
CHAMPEIX, L. N83-26989
CHAN, K. C. D. N83-27735
CHAN, S. M. N83-27394
CHANG, R. K. N83-26975
CHANG, Y. K. N83-27888
CHAO, A. W. N83-27870
CHAPMAN, G. M. N83-27304
CHAPPELLE, E. W. N83-27569
CHAPYAK, E. J. N83-26978
CHAUHAN, S. P. N83-26967
CHEN, B. C. J. N83-27085
CHEN, C. N83-27267
CHEN, C. S. N83-27542
CHEN, H. N83-27096
CHEN, R. T. N83-27877
CHEN, W. S. N83-27451
CHENIER, C. L. N83-26940
CHESTER, P. G. N83-27480
CHESTERS, D. N83-27522
CHI, M. T. H. N83-27592
CHIBA, K. N83-27365
CHIDLEY, B. G. N83-27726
N83-27736
N83-27740
N83-27756
CHOU, Y. T. N83-27891
CHOUDHURY, B. J. N83-27307
CHRIEN, R. E. N83-26955
CHRISTEN, D. K. N83-27888
CHU, B. T. N83-26975
CHUAN-MIAO, C. N83-27672
CHUDNOVSKY, A. N83-27256
CHURCH, H. W. N83-27555
CHUVILO, I. V. N83-27747
CICONE, R. C. N83-27325
CIRAOLO, L. N83-27533
CITRON, A. N83-27728
CLARK, J. C. N83-27843
CLARKE, D. R. N83-26932
CLEMENT, P. N83-27645
CLENDENIN, J. E. N83-27753
CLIFFT, B. E. N83-27730
CLINE, T. L. N83-27933
CLOUGH, R. W. N83-27277
COAKLEY, T. J. N83-27149
COBB, J. T., JR. N83-27444
COCKRELL, C. R. N83-26892
CODY, J. M. N83-27889
COFFEE, T. P. N83-26938
COHN, J. N83-27474
N83-27475
COLADONATO, M. H. N83-26941
COLE, F. T. N83-27771
COLEMAN, M. C. N83-27225
COLEMAN, M. M. N83-27046
COLEMAN, S. D. N83-27438
COLLOM, R. R. N83-26839
COLTON, E. P. N83-27774
COLWELL, R. N. N83-27284
CONFORTI, M. N83-27671
CONNELL, J. R. N83-27383
CONSTANT, T. N. N83-27753
CONTE, D. V. N83-27799
CONVERTI, J. N83-27226
CONWAY, E. J. N83-27200
COOK, W. A. N83-27664
COOKE, R. R. N83-27882
COOPER, L. P. N83-26924
CORA, D. N83-27249
CORLIS, N. E. N83-27611
CORMACK, R. N83-27590
CORNUEJOLS, G. N83-27671
COVEY, R. R. N83-27245
COWAN, J. P. N83-27796
COX, K. J. N83-26900
COX, N. D. N83-27838
COX, S. A. N83-27564
COX, S. C. N83-27326
COYNER, J. V., JR. N83-26862
N83-26876
CRAFTS, C. C. N83-27462
CRAGIN, J. H. N83-27558
CRAIG, J. E. N83-27845
CRAIG, R. G. N83-27312
CRAIG, R. R. N83-26791
CRAMBLIT, D. C. N83-26906
CRAMER, K. R. N83-26797
CRAN, E. S. N83-26939
CRANDALL, K. R. N83-27731
CRAWFORD, R. B. N83-27390
CRAWLEY, A. B. N83-27529
CREAMER, D. N83-27403
CROOKS, P. N83-27221
CROSBY, F. K. N83-27784
CROSBY, W. A. N83-26915
CROSS, W. H. N83-27078
CROSSMAN, F. W. N83-26867
CROSSWELL, W. F. N83-26889
N83-26894
N83-27086
CROUCH, K. E. N83-26829
CROWE, D. R. N83-27795
CROY, D. E. N83-27158
CUDAHY, G. F. N83-26799
CUMINO, G. N83-27233
CURA, J. J. N83-27568
CURTICE, D. H. N83-27394
CURTIS, C. D. N83-27737
CURZI, L. N83-27118

D

DABROWSKI, A. J. N83-27193
DACHSELT, W. D. N83-27359
DACUNHA, N. M. C. N83-27146
DAEHNE, M. N83-27748
DAHMS, G. E. N83-27060
DAILEY, C. L. N83-27304
DALLAM, C. B. N83-27231
DALY, K. C. N83-26900
DAND, I. W. N83-27212
DANGELO, J. C. N83-27462
DANIELS, P. A. N83-27553
N83-27554
DANILTSEV, E. N. N83-27747
DANKO, T. V. N83-26991
DARCY, T. F. N83-26909
DASGUPTA, A. N83-27891
DATEMA, C. P. N83-27186
DAUGHERTY, J. K. N83-27931
N83-27934
DAVID, S. A. N83-27215
DAVIES, C. B. N83-26918
DAVIES, P. B. N83-26985
DAVIS, A. N83-27046
DAVIS, C. G. N83-27943
DAVIS, J. S. N83-27544
DAVIS, L. S. N83-27640
N83-27848
N83-27849
DAW, C. S. N83-27243
DEALMEIDA, T. I. R. N83-27320
DEAQUINO, L. C. S. N83-27283
DEBOOR, C. N83-27659
DEBRULER, M. M. N83-27630
DECKER, E. R. N83-27525
DEFALIAS, Y. F. N83-27523
DEHOOG, F. N83-27659
DEITINGHOFF, H. N83-27744
N83-27748
DEJONG, J. N83-26825
DEJONG, T. N83-27279
DELGUERRA, A. N83-27571
DEMING, D. N83-27518
DEMING, J. W. N83-27569
DEMONIS, I. M. N83-27030
DEMUREN, A. O. N83-27178
DENISON, A. B. N83-27834
DENNATALE, J. S. N83-27523
DENNEHY, G. N83-27417
DERBENWICK, G. F. N83-27886
DERIEL, S. R. N83-27039
DERRINGER, G. C. N83-27079
DESOUZA, F. N83-27844
DESOUZA, L. F. N83-27281
N83-27282
N83-27314
DETWILER, A. N83-27542
DEWAR, R. L. N83-27866
DEYOUNG, R. J. N83-27200
DIEHL, S. E. N83-27610
DIENES, G. J. N83-26981
DIERCKS, D. R. N83-26947
DIETZMAN, W. D. N83-27334
DING, J. L. N83-26997
N83-26998
DIPIPPO, R. N83-27379
DIROUCHOUX, P. N83-27933
DIXON, R. W. N83-27565
DOBBS, K. N83-27746
DOCTOR, R. D. N83-27508
DOCTOR, S. R. N83-27804
DOHERTY, T. J. N83-27465
DOKE, T. N83-27702
N83-27712
DONALDSON, A. R. N83-27783
DONGARRA, J. J. N83-27695
DONNELLY, J. J., JR. N83-27245
DOOLEY, J. L. N83-27927
DORNHOEFER, G. N83-27209
DORWART, B. C. N83-27188
DOSSANTOS, A. P. N83-27281
N83-27282
N83-27283
N83-27314
DOSSANTOS, J. R. N83-27283
DOTSENKO, Y. N. N83-26842
DOUGHERTY, D. A. N83-27158
DOYLE, B. L. N83-27814
DRACHMAN, R. J. N83-27932
DRAGEL, G. M. N83-26947
DREICER, H. N83-27861
DRESSENDORFER, P. V. N83-27610
DREWRY, J. E. N83-26791
DREYFUSS, P. N83-27027
N83-27028
DROBYSHEV, V. I. N83-27574
DROEGE, J. W. N83-26967
DRUCE, S. G. N83-27015
N83-27260
DUBOIS, R. D. N83-27823
DUGAN, V. I. N83-27395
DUGGIN, M. J. N83-27321
DUKE, J. C., JR. N83-27248
DUMITRU, E. T. N83-26936
DUNCAN, A. A. N83-27044

DUNCAN, C. S. N83-27353
DUPUY, C. G. N83-26941
DURHAM, I. N83-27906
DUSZEK, M. K. N83-27252
DWYER, H. A. N83-26976
DWYER, J. R. N83-27227

E

EARLEY, L. M. N83-27741
EASTERLING, K. E. N83-26933
ECKSTEIN, Y. N83-27027
N83-27028
ECKSTROM, B. P. N83-27385
EDWARDS, G. R. N83-27234
EKSEL, M. N83-27470
ELBER, W. N83-27017
ELDREDGE, D. N83-26847
ELLIS, D. D. N83-27798
ELLIS, J. S. N83-27531
ELLIS, P. F., II N83-27391
ELSBERRY, R. L. N83-27545
EMERGY, A. F. N83-27802
ENEVOLDSON, E. K. N83-26846
ENTIN, E. E. N83-27595
ENTINE, G. N83-27392
EPPINGER, J. L. N83-27639
EPSTEIN, M. M. N83-27079
ERICKSON, P. A. N83-27060
N83-27110
ERNST, W. N83-27925
ESHERICK, P. N83-26956
ESSER, M. A. N83-27390
ETERNO, J. S. N83-27595
ETTER, D. M. N83-27663
EUBANK, R. I. N83-27662
EUTENEUER, H. N83-27729
N83-27773
EVANS, J. M. N83-27583
EVERETT, J. R. N83-27310
EWBANK, W. B. N83-27914

F

FAEHL, R. J. N83-27754
FAGER, J. A. N83-26875
FAIRALL, C. W. N83-27548
FALCONER, K. L. N83-27838
FALCONER, P. N83-27542
FALLON, P. N83-26951
FALTENS, A. N83-27769
FAN, L. S. N83-27500
N83-27501
FANFONI, K. J. N83-27385
FARBER, B. N83-27266
FARBER, P. S. N83-27508
FARDINK, P. J. N83-27624
FARRELL, K. N83-27009
FEDERICO, P. A. N83-27593
FEDOROV, V. P. N83-27574
FEE, D. C. N83-27500
N83-27501
FEIBELMAN, P. J. N83-27887
FELTHAUSER, K. N83-27844
FENNER, M. F. N83-27455
FEREBEE, M. J., JR. N83-26883
FERGUSON, G. M. N83-27110
FERGUSON, J. A., III N83-26841
FERGUSON, M. C. N83-27324
FESSENDEN, T. J. N83-27843
FETTIS, H. E. N83-26801
FIELDS, D. B. N83-27450
FIHEY, J. L. N83-27222
FILATOV, O. G. N83-27851
N83-27852
FILIPPONI, P. N83-27119
N83-27124
FINDLEY, W. N. N83-26997
N83-26998
FINEGOLD, J. G. N83-27054
FISHER, G. W. N83-27328
FISHER, W. A. N83-27811
FLAGG, C. N. N83-27568
FLAX, A. H. N83-26795
FLEISCHMANN, M. N83-27014
FLYNN, B. M. N83-26888
FOFONOFF, N. N83-27562
FOMIN, V. I. N83-27677
FORMAN, S. E. N83-27427
FORTUNE, M. A. N83-27541
FOULDS, J. R. N83-27224
FOURIE, O. L. N83-27478
FRALEY, T. R. E. N83-27605
FRANK, G. N83-27362
FRANKOVICH, K. N. N83-27099
FRASER, F. W. N83-27228
FRAZIER, J. A., JR. N83-27093
FREELAND, R. E. N83-26872
FREUND, D. J. N83-27637
FREY, E. W. N83-27432
FRIEDLANDER, S. K. N83-27184
FRIESE, G. J. N83-26877
FRONING, J. N. N83-27593
FROST, R. H. N83-27234
FRYE, D. N83-27568
FUGITT, J. A. N83-27784
FUJII, T. N83-27223
FUJIMOTO, F. N83-27707
FUJIMURA, T. N83-27218
FUKATSU, N. N83-27892
FUKUDA, S. N83-27761
FUKUSHIMA, T. N83-27786
N83-27787
FUKUZAWA, F. N83-27718
FULLWOOD, R. N83-27139
FUNK, W. N83-27847
FURUKAWA, H. N83-27229

G

GABRIEL, J. R. N83-27695
GADE, M. N83-26935
GADGIL, S. G. N83-27918
GAFFNEY, J. S. N83-27507
GAHN, R. F. N83-27344
GALVIN, G. J. N83-27205
GAMMEL, G. N83-27746
GAMMON, B. E. N83-27895
GAN, M. A. N83-27539
N83-27540
GANLEY, J. T. N83-27204
GARCIA, N. F. N83-26873
GARMLAND, S. N83-27142
GARRETT, D. N83-26912
GARRETT, L. B. N83-26863
GARSCADDEN, A. N83-26810
GARTLING, D. K. N83-27167
GASPAR, T. A. N83-27191
GAY, B. M. N83-27466
GAY, G. T. N83-27555
GEHRELS, N. N83-27933
GEMMELL, D. S. N83-27720
GENONI, T. C. N83-27777
GEORGE, P. E. N83-26965
GEORGE, R. L. N83-27383
GERDIN, G. N83-27858
GERICKE, E. N83-27902
GHOSH, V. J. N83-26981
GIAMATI, C. C. N83-26838
GIBSON, G. P. N83-27280
GILGENBACH, R. M. N83-27207
GILMER, B. R. N83-26818
GILMORE, A. N83-27289
GILPIN, E. C., JR. N83-27619
GIRRENS, S. P. N83-27166
GIVEN, P. H. N83-27046
GLADNEY, E. S. N83-27513
GLASER, F. W. N83-27794
GLASER, R. N83-27592
GLASSMAN, A. J. N83-26817
GLESSNER, J. W. N83-26937
GLEZER, G. M. N83-27030
GLUCKSTERN, R. L. N83-27749
N83-27770
GNOFO, P. A. N83-27150
GOBLE, J. H., JR. N83-27833
GODFREY, B. B. N83-27777
GODOY, A. M. N83-27316
GOETSCHALCKX, M. N83-27609
GOFF, F. N83-27525
GOLDMAN, R. F. N83-27586
GOLDNER, R. B. N83-27392
GONCHAR, N. M. N83-27575
GONULLU, B. N83-27114
GONZALEZ, R. R. N83-27580
N83-27581
GOODMAN, J. P. N83-27107
GOODWIN, R. W. N83-27782
GORESH, J. W. N83-26801
GORMAN, F. N83-27563
GOUGEON, M. N83-27347
GOULD, J. P. N83-27078
GOULIANOS, K. N83-27830
GOVADA, A. N83-27248
GOW, A. J. N83-27558
GRAHAM, R. W. N83-27144
GRALENSKI, N. M. N83-27368
GRAN, R. N83-26882
N83-26899
GRANATO, A. V. N83-27806
GRANQVIST, C. G. N83-27363
GRANT, E. H. N83-27582
GRANT, N. J. N83-27008
GRAY, D. N83-27406
GRAY, H. L. N83-27297
GREENBAUM, E. N83-27428
N83-27429
GREENE, W. H. N83-26871
GRENIER, Y. N83-27676
GRESS, A. V., JR. N83-27208
GRIBBLE, R. P. N83-27804
GRIFFIN, C. E. N83-27184
GRILL, A. N83-27020
GRILLO, D. N83-27118
N83-27125
GRIMM, R. C. N83-27866
GRITZO, R. E. N83-27760
GROAT, C. G. N83-27473
GROESBECK, D. E. N83-27793
GROSS, D. W. N83-26907
GROTH, A. N83-27598
GRUBB, A. D. N83-27367
GSCHNEIDER, K. A., JR. N83-27396
GUDERLEY, K. G. N83-26789
GUENTHER, P. T. N83-27001
N83-27827
N83-27883
GUIMARAES, P. S. N83-27878
GUPTA, A. N83-27130
GUPTA, K. K. N83-27642
GUSTAFSON, D. E. N83-26883
GUSTAVSSON, L. H. N83-27175
N83-27176
GUY, A. W. N83-27090
GWILLIAM, W. J. N83-27339

H

HAACKE, G. N83-27360
HACK, A. N83-27601
HADFIELD, S. M. N83-27623
HADLEY, R. T. N83-27628
HAGENSON, R. L. N83-27861
HAGGMARK, L. G. N83-27814
HAI, O. Y. N83-27398
HALBACH, K. N83-27749
HALE, G. J. N83-27003
HALFMANN, K. D. N83-27744
HALLER, G. I. N83-27449
HALLETT, S. G. N83-26953
HAMBERG, I. N83-27363
HAMEURY, J. M. N83-27933
HAMILTON, E. C. N83-26859
HAMM, L. L. N83-27897
HAMMEL, J. E. N83-27859
HAMMOND, R. B. N83-27205
HAMMOND, R. P. N83-27927
HAMROCK, B. J. N83-27214
HAN, L. S. N83-26929
HANDRICK, K. N83-26935
HANKEY, W. L. N83-26793
HANKS, B. N83-26904
HANNA, B. M. N83-27737
HANNUM, N. P. N83-26923
HANSEN, C. F. N83-27809
HARDING, A. K. N83-27930
N83-27931
N83-27934
HARDT, D. E. N83-27226
HARDY, G. H. N83-26845
HARKNESS, J. D. N83-27351
N83-27352
HARLEN, F. N83-27582
HARNISS, R. O. N83-27309
HARRINGTON, R. F. N83-26860
HARRIS, D. N83-27254
HARRIS, J. E. N83-26901
HARRISON, J. K. N83-26906
HARRISON, R. L. N83-27065
HART, G. W. N83-27399
HART, R. S. N83-27103
HARTER, H. L. N83-26813
HARTLEY, R. N83-27616
HARTOP, R. W. N83-27085
HARTWIG, E. K. N83-27369
HASINGER, S. N83-26804
HASSELL, J. A. N83-27079
HASSELMAN, D. P. N83-27026
HATA, W. Y. N83-27835
HATTIS, P. D. N83-26900
HATTORI, T. N83-27786
HAUSER, G. C. N83-27611
HAXTON, W. C. N83-27828
HAY, R. D. N83-27745

HAYAKAWA, K. N83-27743
HAYASHI, T. N83-27712
HEALZER, J. N83-27172
HEDAHL, T. G. N83-27839
HEDGEPETH, J. M. N83-26871
HEDMAN, P. O. N83-26972
HEFFNER, R. H. N83-27834
HEIMERL, J. M. N83-26938
HEISER, W. H. N83-26790
HELLDEN, U. N83-27308
HELMER, D. N83-27301
HENDRICKS, R. C. N83-27016
HENNEKE, E. G., II N83-27248
HENNING, W. N83-27780
HENRICKS, W. N83-27795
HEPBURN, J. D. N83-27738
HERBERT, J. J. N83-26861
HEREWARD, H. G. N83-27752
HERINGHAUS, H. N83-27778
HERLEVICH, A. N83-27414
HERMES, O. D. N83-27331
HERMINGHAUS, H. N83-27729
N83-27773
HERMOCH, V. N83-27128
HEROT, C. F. N83-27621
HERRINGTON, C. R. N83-27415
HERRMANN, L. R. N83-27523
HESS, M. N83-26912
HEVENOR, C. N83-26790
HEYMAN, E. C. N83-27413
HEYNE, W. N83-27729
HEYWOOD, J. G. N83-27179
HICKOX, C. E. N83-27167
HIGDON, R. L. N83-27164
N83-27165
HIGHTOWER, J. D. N83-27908
HILBRAY, R. E. N83-27195
HILL, L. N83-27387
HILL, N. V. N83-27091
HILLIG, O. R. N83-27452
HILLMAN, J. J. N83-27518
HIMENO, S. N83-27853
HINDSON, W. S. N83-26845
HINSON, W. F. N83-26877
HIPPS, L. E. N83-27313
HIPPSLEY, C. A. N83-27015
HIRANO, K. N83-27853
HIRSCHON, A. S. N83-26957
HITT, E. N83-26847
HJORTSBERG, A. N83-27363
HOCKING, G. N83-27398
HODGE, R. C. N83-27433
HODGE, S. B. N83-27740
HODGES, W. T. N83-27018
HOEHNE, J. L. N83-27923
HOELLIG, K. N83-27656
HOFFMAN, H. W. N83-27502
HOFFMAN, P. S. N83-27127
HOFFMAN, R. A. N83-27519
HOFLE, M. M. N83-27016
HOFMANN, I. N83-27751
HOGAN, A. N83-27542
HOLCOMB, D. J. N83-27805
HOLKO, K. H. N83-27239
HOLLEBECEK, R. J. N83-27753
HOLLENBACH, D. N83-27939
HOLMBOM, A. N83-27515
HOLSINGER, R. F. N83-27749
N83-27770
HON, R. W. N83-27130
HONG, T. H. N83-27616
HONMA, H. N83-27761
HOOK, W. R. N83-26865
HOOTMAN, H. D. N83-27838
HOOVER, W. G. N83-27156
N83-27831
HOPPER, J. H., III N83-27651
HORI, T. N83-27786
N83-27787
HORNER, J. E. N83-26811
HORSTEIN, M. N83-26856
HORTON, L. N83-27207
HORVATH, R. N83-27325
HOSOI, Y. N83-27223
HOWARD, D. N83-27766
HOWELL, J. A. N83-27335
HOWELL, J. C. N83-27333
HOWSON, R. P. N83-27364
N83-27371
HOYLE, F. N83-27940
N83-27941
N83-27942
N83-27944
HUANG, H. S. N83-27508
HUANG, K. F. N83-27806
HUANG, K. T. N83-27909
HUBBLE, B. R. N83-27506
N83-27508
HUBER, H. D. N83-27631
HUBERTZ, J. M. N83-27561
HUCKINGS, E. K., III N83-26898
HUGHES, R. C. N83-27137
HULTON, V. N. N83-27900
HUMPHREY, A. E. N83-27048
HUNN, B. D. N83-27420
HUNTER, P. H. N83-27844
HUTCHEON, R. M. N83-27726
N83-27762
HUTH, G. C. N83-27193
HUTSON, R. L. N83-27834

I

IBERT, P. J. N83-27894
IGEL, E. A. N83-27197
ILEGBUSI, J. O. N83-27181
N83-27182
IMBRIALE, W. N83-26893
IMESON, D. N83-27008
IMKER, E. F. N83-27905
INNES, W. N83-27194
ISHIWARI, R. N83-27698
N83-27699
N83-27700
IWANCZYK, J. S. N83-27193
IYEMORI, T. N83-27519

J

JABIR, N. L. N83-27940
N83-27941
N83-27942
JACKLIN, W. L. N83-27626
JACKSON, G. N83-27031
JACOBS, E. N83-27443
JACOBSON, M. J. N83-27800
JAEGER, C. D. N83-27462
JAFFRE, P. N83-27143
JAMES, M. B. N83-27753
JAMESON, R. A. N83-27724
N83-27732
JANNEY, J. L. N83-27045
JANSSEN, E. N83-27172
JARVINEN, P. O. N83-27437
JASINSKI, T. J. N83-27875
JAVIDI, S. N83-27108
JAWORSKI, G. W. N83-27188
JAYNES, R. A. N83-27309
JEFFERS, E. L. N83-27569
JENNINGS, C. W. N83-27064
JENNISON, D. R. N83-27832
JESKE, H. O. N83-26917
JEWELL, W. J. N83-27385
JOENSSON, U. N83-26984
JOHANSSON, D. N83-27318
JOHNSON, B. N83-27374
JOHNSON, C. N83-27674
JOHNSON, G. K. N83-27348
JOHNSON, I. N83-27500
N83-27501
JOHNSON, K. N83-26994
JOHNSON, K. W. N83-27730
JOHNSON, L. L. N83-27922
JOHNSON, R. A. N83-27587
JOHNSON, R. B. N83-27090
JOHNSON, W. R. N83-27302
N83-27303
JOHNSSON, K. O. N83-27404
JONES, B. A. N83-27690
JONES, G. S. N83-26822
JONES, L. W. N83-27200
JONES, R. F. N83-27417
JONES, W. M. N83-27455
JUNIOR, P. N83-27744
N83-27748

K

KABAT, L. G. N83-27596
KABRICK, R. M. N83-27385
KAELLMAN, S. N83-27598
KAESCHE, H. N83-26990
KAILASANATH, K. N83-26939
KAISER, J. A. C. N83-27563
KAISER, K. H. N83-27729
N83-27778
KAMADA, A. N83-27232
KANDARPA, V. N83-26949
KANE, R. P. N83-27521
KANEKO, T. N83-27717
KANEMASU, E. T. N83-27313
KANT, E. N83-27643
KAPCHINSKIJ, I. M. N83-27747
KARDASHEV, N. S. N83-27945
KARFUNKEL, B. S. N83-27327
KARIM, L. M. N83-27944
KARLSSON, B. N83-27361
KARLSSON, T. N83-27142
KARNITZ, M. A. N83-27470
KARPOVICH, Y. F. N83-27030
KARPUK, M. N83-27414
KATAYAMA, T. N83-27787
KATAYAMA, Y. N83-27707
KAUER, E. N83-27362
KAUFFMAN, J. F. N83-26895
KAUFMAN, A. N83-27348
KAUFMANN, P. N83-27948
KAWATA, S. N83-27854
KAWATSURA, K. N83-27707
KAZANAS, D. N83-27935
KEAFER, L. S., JR. N83-26860
N83-26865
KEANE, J. N83-27746
KEDDY, E. S. N83-27936
KEE, R. J. N83-27169
KEEFE, D. N83-27769
KELLER, H. B. N83-27659
KEM, D. A. N83-27605
KEMP, N. H. N83-26962
KENDALL, J. W. N83-27136
KENDERDINE, E. W. N83-27110
KERCHNER, H. R. N83-27888
KERN, E. C., JR. N83-27140
KERR, B. S. N83-27690
KHARCHENKO, V. A. N83-26992
KIEFER, J. H. N83-27236
KIERAS, C. E. N83-27872
KIESLING, J. D. N83-26855
KIHLBLOM, U. N83-27318
KIM, B. M. N83-26963
KIM, B. R. N83-27078
KIM, K. N83-27266
KIMURA, K. N83-27719
KIMURA, S. G. N83-26963
KING, N. S. P. N83-27850
KINSLER, M. N83-27301
KIRSCHNER, C. N83-27419
KISHORE, R. N83-27810
KISTLER, A. N83-27387
KITAGAWA, M. N83-27715
KITTEL, P. N83-27676
KITTLER, W. C., JR. N83-27370
KIYA, M. K. N83-26858
KLAUS, R. N83-27071
KLEFFER, L. J. N83-27199
KLEIN, H. N83-27744
N83-27748
KLEIN, R. N83-27773
KLEIN, S. N83-27194
KLEMAN, B. N83-27210
KLINESTIVER, L. R. N83-27602
KNAPIK, J. J. N83-27585
KNAPP, C. F. N83-27583
KNAPP, E. M. N83-27311
KNAUER, P. N83-27069
KNUDSEN, G. A. N83-27900
KOBAYASHI, H. N83-27722
KOCH, C. C. N83-27891
KOCH, C. D. N83-27335
KOCHERGIN, V. G. N83-26992
KOELLING, G. N83-26935
KOENIG, D. R. N83-27836
KOENIG, W. N83-27074
KOESTLIN, H. N83-27362
KOGA, R. N83-27610
KOLASINSKI, W. A. N83-27610
KOMAKI, K. N83-27704
N83-27707
KOMATSU, H. N83-27223
KOONTZ, R. F. N83-27739
KOSKY, P. G. N83-26959
N83-26960
KOSOWSKI, G. N83-27401
KOSSLYN, S. M. N83-27591
KOSTIUK, T. N83-27518
KOSUGE, S. N83-27229
KOUSKY, V. E. N83-27539
N83-27540
N83-27541
KOVACS, A. N83-27558
KOZODAEV, A. M. N83-27747
KOZUCHOWSKI, A. N83-27095
KOZUKA, Z. N83-27892
KRAKOWSKI, R. A. N83-27861
KRAMER, S. D. N83-27817
KRAMLICH, D. N83-27621

KRAMLICH, J. C. N83-26958
KRANTZ, J. N83-27301
KRASNIKOV, V. Y. N83-27573
KRAUS, A. D. N83-27066
KREBSCHULL, K. N83-27542
KRECH, R. H. N83-26945
KREGLEWSKA, T. N83-27608
KREGLEWSKA, U. N83-27608
KREIDEL, H. J. N83-27729
N83-27775
KRIMIGIS, S. M. N83-27946
KRISHNAN, R. P. N83-27404
KROUTIL, J. C. N83-27157
KRUGER, J. N83-26995
KRYZHANOVSKIJ, A. V. N83-27755
KRZEMINSKI, J. N83-26993
KUJBIDA, R. P. N83-27755
KUKKONEN, A. N83-27198
KULKARNI, S. V. N83-26930
N83-26931
KUMARESAN, R. N83-27646
KUNZ, A. B. N83-27880
KUO, J. S. H. N83-27084
KURTZ, S. R. N83-27137
KUSHIN, V. V. N83-27747
KUSMISS, J. H. N83-27193
KUSSMAUL, K. N83-27217
KUWATA, N. N83-27719
KUX, H. J. N83-27281
N83-27282
N83-27314

L

LACY, R. G. N83-27375
LAEUR-SCHMALTZ, H. N83-27074
LAGERKVIST, L. N83-27272
N83-27274
LAGOW, R. J. N83-26936
LAI, T. H. N83-27648
LAIRD, C. N83-27002
LAKIN, K. M. N83-27135
LAKSHMINARAYANA, B. N83-26819
LAMB, D. A. N83-27906
LAMBERT, J. A. N83-27230
LAMBY, E. J. N83-26959
N83-26960
LAMPERT, C. M. N83-27357
N83-27358
LANCASTER, H. N83-27766
N83-27785
LAND, D. J. N83-27705
LANDIN, A. R. N83-27135
LANE, S. O. N83-26888
LANG, J. H. N83-26878
LANG, M. N83-27061
LANGBEIN, K. N83-27748
LANGMUIR, M. E. N83-26968
LANHAM, D. D. N83-26915
LAO, C. N83-27096
LARI, R. J. N83-27767
LARIMORE, W. E. N83-26883
LARK, R. F. N83-27347
LARSON, B. C. N83-27888
LASTER, W. R. N83-27466
LAUER, D. T. N83-27292
LAURENDEAU, N. M. N83-26965
N83-27356
LAW, C. H. N83-26798
LAWSON, J. D. N83-27772
LAZAREV, N. V. N83-27747
N83-27755
LEANDER, G. A. N83-27816
LEAVENWORTH, R. S. N83-27686
LEBOEUF, C. M. N83-27386
LECKY, J. A. N83-27508
LEE, D. A. N83-26809
LEE, J. N83-27161
LEE, K. F. N83-26802
LEE, M. J. N83-27753
LEE, T. H. N83-27522
LEE, Y. T. N83-26946
LEGERE, A. J. N83-27204
LEMASCON, A. N83-27248
LEMONS, D. S. N83-27754
LENC, J. F. N83-27500
N83-27501
LENNARD, W. N. N83-27711
LEON, M. N83-27834
LEPPING, R. P. N83-27946
LESKOVAR, B. N83-27132
LEUNG, L. N83-27109
LEVI-SETTI, R. N83-27709
LEVINE, D. M. N83-27537
LEVINE, S. R. N83-27022
LEVY, E. N83-27562
LEVY, P. F. N83-27039
LEVY, S. C. N83-27462
LEWANDOWSKI, A. N83-27608
LEWIS, J. M. N83-27049
LEWIS, P. F. N83-26962
LI, C. C. N83-27239
LIEBERMAN, M. N83-27398
LIEN, P. L. N83-27390
LIENHART, W. N83-27183
LIGHTNER, E. B. N83-26853
N83-26879
LIKENS, W. C. N83-27293
LILLARD, L. N. N83-26852
LILLEY, D. E. N83-26822
LINDBERG, S. E. N83-27504
LINGENFELTER, A. C. N83-27240
LINGENFELTER, R. E. N83-27936
LINN, J. K. N83-27170
LINSENMEIER, J. A. W. N83-27596
LIPHARD, K. G. N83-26935
LIPINSKY, E. S. N83-27436
LISTH, O. N83-27056
LITTMARK, U. N83-27706
LIU, S. N83-27231
LIVDAHL, P. V. N83-27725
LIVENGOOD, C. D. N83-27508
LIVINGSTON, P. L. N83-27265
LO, C. C. N83-27132
LODE, W. N83-27257
N83-27258
LOEFSTROEM, J. N83-27673
LOEW, G. A. N83-27753
LONG, G. G. N83-26995
LONG, M. B. N83-26975
LONG, W. D. N83-27035
LONGANBACH, J. R. N83-26967
LORENTZ, D. G. N83-27004
LORENZ, J. C. N83-27530
LOSCHIALPO, P. N83-27772
LOVELL, H. L. N83-27046
LOVELY, R. H. N83-27090
LOVETT, G. M. N83-27504
LOVILL, J. E. N83-27531
LOWNIE, H. W., JR. N83-27191
LU, C. T. N83-27032
LUCAS, J. G. N83-27794
LUCEY, R. N83-27202
LUDEMANN, C. A. N83-27915
LUDFORD, G. S. N83-26943
LUDWIG-MERTIN, U. N83-27729
N83-27778
LUNDBERG, L. B. N83-27836
LUSTIGER, A. N83-27079
LUTHER, F. M. N83-27531
LUTZ, S. A. N83-27505
LYNN, R. N83-27193
LYONS, J. B. N83-27329

M

MACBAIN, J. C. N83-26811
MACH, K. D. N83-26806
MACHLES, G. W. N83-26922
MACKNICK, A. B. N83-26964
MACZYNSKI, J. N83-27613
MADER, C. L. N83-27052
MADKOUR, S. A. N83-27113
MAGAVERO, G. N83-27681
MAGNELL, B. A. N83-27568
MAHONEY, P. C. N83-27397
MAKO, F. N83-27202
MALET, P. N83-27343
MALILA, W. A. N83-27323
N83-27325
MALMQVIST, H. N83-26984
MALOY, J. E. N83-26864
N83-26922
MANELA, J. N83-27152
MANGENG, C. N83-27419
MANGO, S. N83-27100
MANICHAM, J. N83-27866
MANN, W. C. N83-27622
MANNAMI, M. N83-27719
MANOS, G. C. N83-27277
MAR, J. N83-26869
MARA, G. N83-27472
MARGULIES, L. N83-27947
MARKHAM, R. L. N83-27079
MARKOVICH, P. N83-27730
MARKOWICH, P. N83-27649
MARSHALL, B. W. N83-27389
MARSHALLA, R. A. N83-27053
MARTIN, C. G. N83-26940
MARTIN, E. R. N83-27760
MARTIN, R. L. N83-27767
MARTINEZ, V. A. N83-27760
MARTINS, R. C. D. O. N83-27087
MASCETTI, G. J. N83-27244
MASCHKE, A. N83-27746
MASI, C. G. N83-27745
MASON, D. M. N83-27899
MASQUELIER, M. I. N83-26840
MASSAI, M. M. N83-27571
MASUBUCHI, K. N83-27218
N83-27226
MASUMOTO, I. N83-27218
MATTEN, R. B. N83-27146
MATTHEWS, S. J. N83-27221
MATTHIESSEN, C. M. I. M. N83-27622
MATTINGLY, J. D. N83-27160
MATTSSON, S. N83-27111
MAWDSLEY, R. H. N83-27585
MAXEY, W. A. N83-27079
MAY, E. K. N83-27386
MAYER, J. W. N83-27205
MAYKUT, G. A. N83-27560
MAYLOTTE, D. H. N83-26960
MAYNARD, N. C. N83-27519
MAYNARD, R. L. N83-27206
MAYO, F. R. N83-26957
MAYS, D. A. N83-27049
MCANDLESS, J. M. N83-26940
MCCARTHY, J. S. N83-27779
MCCONNAUGHEY, H. V. N83-26943
MCCORMACK, M. D. N83-27838
MCCORMICK, M. P. N83-27520
MCCOY, J. D. N83-26966
MCDONALD, G. N83-27016
MCDOWELL, S. E. N83-27568
MCGEE, A. C. N83-26999
MCGINNIS, L. F. N83-27901
MCGRATH, D. P. N83-27377
MCHUGH, J. P. N83-27353
MCKEE, D. W. N83-26959
N83-26960
MCKEOWN, J. N83-27735
MCKINLEY, J. M. N83-27937
MCKINNEY, D. B. N83-27328
MCKINNON, J. T. N83-27054
MCMICHAEL, G. E. N83-27726
N83-27736
N83-27740
N83-27756
MCTAMANY, J. E. N83-27557
MCWILLIAMS, P. N83-27512
MEACHUM, J. N83-27207
MEDDAUGH, G. N83-27765
MEE, R. W. N83-27669
N83-27687
MEER, D. E. N83-27641
MEGUSAR, J. N83-27008
MEHRA, R. K. N83-26883
MEHROTRA, S. C. N83-26814
MEIER, E. N83-27746
MELLMAN, G. R. N83-27103
MELSON, G. A. N83-26971
MENDIETA, F. J. N83-27211
MENENDEZ, A. N83-27590
MERLE, K. N83-27729
N83-27775
MEROLA, J. A. N83-27309
MERTENS, P. N83-27710
MERTINS, K. N83-27067
METZBOWER, E. A. N83-27228
METZLER, M. D. N83-27323
MEYER, J. J. N83-27220
MICHEL, W. L. N83-27738
MICKELSEN, R. A. N83-27451
MICOL, J. R. N83-27150
MIDDLEMAN, S. N83-27261
MIKULAS, M. M., JR. N83-26868
MILLER, A. N83-27660
N83-27661
MILLER, C. G. N83-27150
MILLER, E. K. N83-27265
MILLER, E. L. N83-27126
MILLER, H. C. N83-27141
MILLER, H. D. N83-27479
MILLER, J. E. N83-26857
MILLER, J. H. N83-27823
MILLER, R. A. N83-27022
MILLER, R. J. N83-27753
MILLNER, P. P. N83-27097
MILLS, R. S. N83-27732
MILLSAPS, K. N83-26802
MILMAN, M. H. N83-26885
MILNE, T. A. N83-26969
MILSTEIN, F. N83-27266
MINER, G. A. N83-26818
MINERBO, G. N. N83-27749

MINKE, E. N83-27075
MINTZ, Y. N83-27536
MIODUSZEWSKI, P. N83-27868
MISH, W. H. N83-27633
MITCHELL, I. V. N83-27711
MITCHELL, R. E. N83-27169
MITTAG, K. L. N83-27752
N83-27758
MIZUMORI, S. J. Y. N83-27090
MOCCI, U. N83-27119
MOFFETT, D. R. N83-27788
MOHIUDDIN, G. N83-27835
MONAGAN, S. J. N83-26835
MONGE, A. N83-26964
MONTGOMERY, R. C. N83-26887
MONTREUIL, B. N83-27609
MOODY, T. L. N83-27064
MOON, D. W. N83-27228
MOON, H. M. N83-27006
MOORE, D. N83-27292
MORE, J. J. N83-27667
MORETTI, A. N83-27767
N83-27788
MORETTO, L. G. N83-27820
MOREY, R. M. N83-27558
MORGAN, P. E. N83-27881
MOROZ, V. V. N83-27576
MORRIS, J. W., JR. N83-27005
MORSE, N. R. N83-27635
MOSAKOWSKI, T. S. N83-27367
MOSTEK, A. N83-27522
MOTEFF, J. N83-27224
MUELLER, J. N83-27650
N83-27748
MUELLER, R. W. N83-27748
MULCARE, D. N83-26847
MULLEN, R. L. N83-27016
MUMMA, M. J. N83-27518
MUNZ, W. D. N83-27359
MUSANTE, I. N83-27512
MYKLEBUST, R. L. N83-27825
MYLES, K. M. N83-27500
N83-27501
MYUNG, H. C. N83-27694

N

NADERI, F. N83-26854
NAEVERT, U. N83-27674
NAGARAJA, K. S. N83-26787
N83-26805
N83-26812
NAGATA, K. N83-27712
NAKAMURA, N. N83-27380
N83-27743
NAKANISHI, T. N83-27787
NAKAZAWA, T. N83-27223
NAMKUNG, W. N83-27772
NARAYAN, J. N83-27888
NARAYANAN, M. A. B. N83-26800
NATH, B. N83-27237
NAVARA, E. N83-26933
NAVATHE, S. B. N83-27918
NELSON, D. P. N83-26816
NELSON, T. T. N83-27375
NEUMANN, H. E. N83-26838
NEUMANN, W. N83-27748
NEUWORTH, M. B. N83-27406
NEWBURY, D. E. N83-27825
NEWBY, J. W. N83-27792
NEWELL, A. N83-27643
NEWELL, A. C. N83-26896
NGUYEN, L. T. N83-26846
NGUYEN, X. N. N83-27413
NIELSON, C. E. N83-26923
N83-27213
NIGHTINGALE, N. N83-27925
NIKITIN, A. A. N83-27747
NILSSON, B. N83-27269
NILSSON, L. N83-27269
NIU, K. N83-27854
NIXON, J. M. N83-27730
NODA, A. N83-27787
NOGATA, H. N83-27223
NOLAN, M. L. N83-27784
NOLTE, C. G. N83-27638
NOOR, A. K. N83-27259
NORBERG, T. N83-27691
NORRIS, D. D. N83-27184
NORTHROP, D. A. N83-27529
NORUM, B. E. N83-27779
NOVICH, C. M. N83-27481
NOVIKOV, I. D. N83-27945
NOVO, E. M. L. M. N83-27319
NOWAK, W. B. N83-27400
NOYES, H. P. N83-27791
NUMMIPURO, J. N83-27198
NUNES, J. S. D. N83-27281
N83-27282
N83-27314
NUNZ, W. D. N83-27366
NYGREN, H. G. N83-27807

O

OAKES, W. R. N83-27664
OATES, G. C. N83-26807
OBERLIN, C. N83-26989
OBEROI, H. S. N83-27456
OCHOA, A., JR. N83-27610
OCONNELL, R. N83-27938
ODA, N. N83-27721
N83-27722
N83-27723
OEGREN, J. E. N83-27176
OGG, J. S. N83-26811
OGLE, J. W. N83-27850
OHARE, T. E. N83-27405
OHTSUKI, Y. H. N83-27717
OKUMURA, S. N83-27768
OLDANI, J. J. N83-27234
OLOFSSON, G. N83-26984
OLSEN, C. E. N83-27834
OLSEN, L. C. N83-27453
OLSON, D. L. N83-27231
ONEAL, E. N83-27390
ONG, M. M. N83-27636
ONISCHAK, M. N83-27401
OPTUKA, A. N83-27707
OSBORN, A. G. N83-27037
OSHIRO, N. E. N83-27553
N83-27554
OSTRACH, S. N83-27161
OVERACKER, W. G. N83-27367
OWCZARSKI, E. L. N83-27488
OWEN, D. B. N83-27669
N83-27687
OWYOUNG, A. N83-26956
OZAWA, K. N83-27707

P

PABST, M. N83-27731
N83-27757
PACIESAS, W. S. N83-27933
PACKAN, N. H. N83-27009
PAGANO, N. J. N83-27201
PAIGE, T. M. N83-26888
PAINTER, P. C. N83-27046
PAKHUNOVA, L. V. N83-27574
PAKKALA, P. A. N83-27422
PALMER, D. E. N83-27606
PALMER, R. G. N83-27836
PALMOUR, H., III N83-27466
PALMOWSKA, K. N83-27095
PANAYOTOU, N. F. N83-27000
PANDOLF, K. B. N83-27580
PAPELL, S. S. N83-27144
PARABIN, V. V. N83-26991
PARADA, N. D. J. N83-27281
N83-27282
N83-27283
N83-27314
N83-27315
N83-27316
N83-27319
N83-27320
PARDO, R. N83-27730
N83-27780
PARK, C. N83-26918
PARKER, E. R. N83-26999
PARKER, M. A. N83-26968
PASOUR, J. A. N83-27202
PATENAUDE, C. J. N83-27670
PATRINOS, A. A. N. N83-27502
PAUL, C. R. N83-27102
PAYNE, R. N83-26958
PAYNTER, H. M. N83-27226
PEAK, J. E. N83-27545
PEARCEY, H. H. N83-27147
N83-27253
PEASE, S. R. N83-27350
PEERCY, P. S. N83-27205
PEGO, R. L. N83-27159
PEITER, A. N83-27257
N83-27258
PEKRUL, P. J. N83-27452
PELEPEICHENKO, I. P. N83-26842
PENNELL, W. T. N83-27393
PENNEY, T. N83-27168
PENNINGTON, N. J. N83-27559
PEPIN, R. O. N83-27938
PEPPER, D. M. N83-27185
PERCIVAL, C. M. N83-27171
PERELLI, L. P. N83-27594
PERL, M. N83-27194
PERRIN, D. R. N83-27513
PERSSON, R. N83-27556
PERSZ, W. M., JR. N83-26807
PERVIN, E. N83-27600
PETERS, C. N83-27295
PETERSON, D. T. N83-26979
PETERSON, R. C. N83-27356
PETROV, A. K. N83-26991
PETTY, J. S. N83-26787
PHILLIPS, D. N83-27711
PHUA, T. T. N83-26979
N83-27890
PIAZZA, M. N83-27083
PICCIOLO, G. L. N83-27569
PICK, M. A. N83-26981
PICRAUX, S. T. N83-27814
PILE, R. S. N83-27049
N83-27050
PILGER, R. H., JR. N83-27473
PIMBLEY, G. H. N83-27052
PINE, G. D. N83-27470
PINSON, L. D. N83-26870
N83-26901
PINTO, S. D. A. F. N83-27315
PIOLI, M. N83-27121
PIOSCZYK, B. N83-27734
PIRKLE, F. L. N83-27335
PITKAERANTA, J. N83-27674
PITTS, J. N., JR. N83-27035
PIWINSKI, D. N83-27321
PLEWKO, K. N83-27095
POCCI, P. N83-27115
N83-27116
N83-27117
POLNAREV, A. G. N83-27945
PORTER, F. C. N83-27829
PORTER, L. E. N83-27701
PORTER, T. R. N83-26928
POSAKONY, G. J. N83-27804
POSHKUS, N. B. N83-27573
POST, H. N. N83-27435
POTHINI, B. R. N83-27337
POTTER, J. M. N83-27741
N83-27764
POWELL, D. C. N83-27394
POWERS, D. A. N83-27446
PRATT, R. N83-27542
PRAUSNITZ, J. M. N83-26964
PRESTWICH, K. R. N83-27821
PRICE, J. C. N83-27194
PRINA-RICOTTI, L. N83-27115
N83-27116
N83-27117
PURVIS, C. K. N83-26903
PUTERBAUGH, S. L. N83-27154
PYE, E. K. N83-27048

Q

QING, Z. N83-27607
QUINN, T. F. J. N83-27021
QUINN, W. E. N83-27862
N83-27865
QUINONES, C. R. N83-27305
N83-27306

R

RABINOWITZ, P. H. N83-27654
RADZIMINSKI, J. B. N83-27081
RAFIDI, N. R. N83-27334
RAGADINI, M. N83-27571
RAGHURAMAN, P. N83-27397
N83-27399
RAGIONIERI, R. N83-27533
RAHMAT-SAMII, Y. N83-26893
RAISZADEK, F. N83-26976
RAKEL, D. A. N83-27826
RALL, L. B. N83-27655
RALLE, J. N83-27264
RAM, R. B. N83-26812
RAMALHOTO, M. F. N83-27652
RAMATY, R. N83-27928
N83-27936
N83-27937
RAMEY, D. B. N83-27300
RAMOS, M. U. N83-27585

RANDALL, D. C. N83-27583
RANDALL, D. E. N83-27446
RANKEN, W. A. N83-27837
RANNACHER, R. N83-27179
RANNEY, J. W. N83-27430
RAO, D. M. N83-26814
RAPPL, G. N83-27692
RASSBACH, M. E. N83-27296
N83-27299
RATLIFF, H. D. N83-27609
RAUH, R. D. N83-26968
RAWLINS, W. T. N83-26945
RAY, A. K. N83-27880
RAYBURN, L. N83-27841
REAL, M. N83-27528
RECORD, J. N83-27376
REDDY, J. N. N83-27278
REED, J. E. N83-26847
REICHEL, L. N83-27644
N83-27666
REID, M. A. N83-27344
REID, M. D. N83-26833
REIFSNIDER, K. L. N83-26930
REILLY, R. W. N83-27631
REINECK, S. R. N83-27366
REISER, M. N83-27772
REITER, N. N83-27077
REITER, R. N83-27847
REN, L. N83-27270
N83-27271
RENARDY, M. N83-27649
RESASCO, D. E. N83-27449
REUBUSH, D. E. N83-26821
N83-26823
REYNOLDS, S. D., JR. N83-27235
REYNOLDS, W. N. N83-27808
RHODES, D. N83-27276
RIAZ, A. N83-26828
RIBBING, C. G. N83-27361
RICE, S. H. N83-27058
RICHARD, B. D. N83-27134
RICHEY, A. N83-27925
RICKETTS, R. H. N83-26815
RIDDER, S. O. N83-26843
RIDGE, M. I. N83-27364
N83-27371
RIDGWAY, J. R., JR. N83-27373
RIEPE, W. N83-26935
RIGGS, G. E. N83-27260
RINALDI, F. N83-27233
RINTAMAA, R. N83-27275
RITCHIE, I. T. N83-27370
RITCHIE, J. P. N83-27023
RITCHIE, R. H. N83-27708
N83-27713
RITTER, J. J. N83-26995
RIVIERE, J. C. N83-26988
ROACH, F. N83-27419
ROBERSON, C. W. N83-27202
ROBERSON, P. L. N83-27628
ROBERTS, A. G. N83-26974
ROBERTS, R. N83-27469
ROBERTS, R. N. N83-27196
ROBERTS, V. D. N83-27106
ROBINSON, R. D. N83-27513
ROBINSON, S. M. N83-27657
ROBINSON, V. B. N83-27296
RODGERS, L. M. N83-27912
RODI, W. N83-27177
N83-27178
RODRIGUEZ, A. A. N83-27189
RODRIGUEZ, G. N83-26885
RODRIGUEZ, P. N83-27100
ROE, R. J. N83-27025
ROENNBERG, I. N83-26984
ROENNMARK, K. N83-27112
ROESSLER, W. U. N83-27244
ROETHELI, J. C. N83-27050
ROFFE, G. N83-26837
ROGERS, A. N. N83-27378
ROGERS, J. D. N83-27516
ROGERS, J. W., JR. N83-27044
ROGERS, R. N. N83-27045
ROGERS, W. R. N83-27907
ROHWEIN, G. J. N83-27821
ROLLER, M. A. N83-27078
ROMIG, A. D., JR. N83-27825
ROSE, J. F. N83-27326
ROSENBAUM, P. R. N83-27658
N83-27685
ROSENFELD, A. N83-27616
ROSS, T. A. N83-27334
ROTHBART, G. N83-27139
ROTHWELL, W. J., JR. N83-27570
RUBIN, D. B. N83-27685
RUSSELL, M. C. N83-27397
RUSSELL, P. E. N83-27415
RUTH, R. D. N83-27870
RYE, A. R. N83-27615

S

SABOCHICK, M. J. N83-27647
SACCULLO, A. N83-26820
SAGSTETTER, P. W. N83-26916
SAHNI, S. N83-27648
SAINTPAUL, P. N83-26989
SAITO, Y. N83-27761
SAITTO, A. N83-26890
SAJBEN, M. N83-27157
SAKAMOTO, N. N83-27698
N83-27699
N83-27700
SALERNO, L. J. N83-27676
SALTER, I. J. N83-27147
SAMN, S. W. N83-27594
SAMPATH, K. N83-27524
SAMPETH, S. G. N83-27079
SAMPLE, D. G. N83-27170
SAMSONOV, A. N. N83-26991
SAMUELSSON, I. N83-26843
SANDEN, R. N83-27055
SANDER, O. R. N83-27824
SANDERS, B. B. N83-26976
SANDERS, R. N83-27746
SANDERSON, J. E. N83-27039
SANGER, D. N83-26994
SANITZ, D. N83-27758
SANZA, G. J. N83-27510
SATCHLER, G. R. N83-27819
SATO, K. N83-27743
N83-27786
SATTLER, A. R. N83-27529
SAUSEN, T. M. N83-27281
N83-27282
N83-27314
SAVCHUKOV, V. I. N83-26991
SAWKA, M. N. N83-27580
N83-27581
SAXE, J. B. N83-27906
SAYERS, C. M. N83-27250
SCARBROUGH, J. O. N83-27891
SCARLET, R. I. N83-27568
SCHAEFFER, C. L. N83-26977
SCHARF, L. I. N83-27646
SCHARTEL, W. A. N83-26861
SCHEAFFER, R. L. N83-27686
SCHELDERS, C. N83-27528
SCHEMPP, A. N83-27744
N83-27748
SCHERER, M. N83-27359
SCHERTZER, S. P. N83-26945
SCHETZ, J. A. N83-27033
SCHILLACI, M. E. N83-27834
SCHLEICH, H. N83-27072
N83-27073
SCHMITTE, F. J. N83-27362
SCHMUGGE, T. J. N83-27317
SCHNEIDER, C. M. N83-27760
SCHNEPPLE, W. N83-27193
N83-27266
SCHOCK, R. W. N83-26902
SCHOELER, H. N83-27729
SCHOENHALS, R. J. N83-27466
SCHOENLEIN, A. N83-27748
SCHREIBER, J. N83-27346
SCHRIBER, S. O. N83-27726
N83-27736
N83-27740
N83-27763
SCHRUBEN, J. N83-27353
SCHULTZ, J. A. N83-26963
SCHULZ, F. N83-27716
SCHULZE, D. N83-27733
SCHWA, A. C. N83-27043
SCHWANTES, S. N83-27017
SCOTT, A. J. N83-27860
SCOTT, A. M. N83-27203
SCOTT, D. E. N83-27618
SCUDDER, D. W. N83-27859
SCULL, J. R. N83-26921
SEARCY, J. Q. N83-27463
SEARS, W. R. N83-26792
SEEKER, W. R. N83-26958
SEGINER, A. N83-27152
SEIDEL, D. A. N83-26815
SEIDENSTICKER, R. G. N83-27353
SEKULA, S. T. N83-27888
SELF, J. L. N83-27911
SELKOWITZ, S. N83-27357
SELTZER, S. M. N83-27703
SETHIAN, J. A. N83-26948
SHAFER, R. A. N83-27935
SHAH, Y. N83-27511
SHAHNAVAZ, H. N83-27603
SHANG, J. S. N83-26793
SHARP, R. G. N83-26897
SHAW, D. N83-27262
SHAW, T. M. N83-26932
SHEA, M. F. N83-27782
SHEARER, J. A. N83-27500
N83-27501
SHEEHY, T. W. N83-26820
SHEFFIELD, C. N83-27294
SHEFFIELD, S. A. N83-27043
SHEINMAN, I. N83-27262
SHELTON, E. M. N83-27051
SHEPARD, K. W. N83-27730
SHEPARD, M. M. N83-27096
SHEPOSH, J. P. N83-27900
SHEPPARD, A. R. N83-27105
SHEPPARD, J. C. N83-27779
SHEPPARD, R. J. N83-27582
SHERMAN, D. F. N83-27385
SHERMAN, R. N83-26960
SHIDARA, T. N83-27761
SHIGA, A. N83-27232
SHIKANOV, A. S. N83-27867
SHIMADA, H. N83-27223
SHIMADA, T. N83-27707
SHIN, M. C. N83-26947
SHIOMI, N. N83-27696
N83-27699
N83-27700
SHLACHTER, J. S. N83-27859
SHNEIER, M. N83-27616
SHUBALY, M. R. N83-27736
N83-27776
SHUBINA, A. V. N83-27573
SHULER, S. A. N83-27384
SIEGEL, H. J. N83-27285
SIEGMANN, W. L. N83-27800
SIEGRIST, J. L. N83-27753
SIH, G. C. N83-27267
SIMETKOSKY, M. N83-27925
SIMITSES, G. J. N83-27262
SIMMONS, V. P. N83-27797
SIMONEAU, R. N83-27222
SIMPSON, J. N83-27538
SINACORI, J. B. N83-26849
SINGH, M. N83-27100
SINGH, S. N83-27254
SINHA, M. P. N83-27184
SINZ, R. N83-27217
SITARAM, N. N83-26819
SIVASHINSKY, G. I. N83-26943
SKILLERN, C. G. N83-27240
SKINNER, D. F. N83-27450
SKLIZKOV, G. V. N83-27867
SLADKOVIC, R. N83-27847
SLATE, M. P. N83-27354
SLAUGHTER, G. M. N83-27215
SLYUSAREV, V. Y. N83-26992
SMETANA, J. N83-26889
SMIALEK, J. L. N83-27019
SMITH, A. B. N83-27001
N83-27827
N83-27883
SMITH, B. W. N83-27285
SMITH, D. H. N83-27629
SMITH, G. N83-27925
SMITH, G. P. N83-26909
SMITH, G. W. N83-27500
N83-27501
SMITH, J. L. N83-27846
SMITH, L. N83-27750
SMITH, N. K. N83-27895
SMITH, P. G. N83-27596
SMITH, P. J. N83-26972
SMITH, R. E. N83-26835
SMITH, R. L. N83-27808
SMITH, W. W. N83-26864
N83-26922
SMOOT, L. D. N83-26972
SNYDER, G. L. N83-27910
SOBAJIMA, S. N83-27365
SOBRA, K. N83-27128
SOLIZ, P. N83-27544
SOLTYS, M. N. N83-26969
SOMETANI, T. N83-27655
SOMORJAI, G. A. N83-26950
SOOSAAR, K. N83-26905
SORBELLO, R. N83-26889
SOROKINA, Y. I. N83-27573
SPACKMAN, W. N83-27046
SPAIN, I. L. N83-27879
SPALDING, D. B. N83-26986
N83-27180

N83-27181
N83-27182
SPALLA, P. N83-27533
SPANDRE, G. N83-27571
SPEARMAN, M. L. N83-26785
SPENCE, D. A. N83-27653
SPENCER, P. N. N83-26999
SPIRO, C. L. N83-26959
N83-26960
SPIVAK, A. L. N83-27876
SPONABLE, J. M. N83-26913
SPRANGLE, P. N83-27202
SPUR, G. N83-27067
SQUILLANTE, M. R. N83-27392
STABLEIN, N. K. N83-27335
STAFFORD, J. V. N83-27384
STALLINGS, T. L. N83-27037
STANDING, R. G. N83-27146
STANGE, W. A. N83-26811
STANTAN, J. E. N83-26974
STANTON, B. J., JR. N83-27913
STAYTON, R. N83-27474
N83-27475
STCLAIR, T. L. N83-27018
STEARNS, S. D. N83-27663
STEELE, B. J. N83-27552
STEINBERG, M. N83-26951
STEINMETZ, J. S. N83-27634
STELLWAG, B. N83-26990
STENGER, J. B. N83-27062
STEPANOV, V. M. N83-27030
STEPHENSON, G. G. N83-27219
STEPHENSON, G. J., JR. N83-27812
STERN, B. E. N83-27945
STERN, D. P. N83-26985
STERN, M. N83-27308
STETSON, K. F. N83-26794
STEVENS, N. J. N83-26903
STICKFORD, G. H. N83-26967
STINCHCOMB, W. W. N83-27248
STOCKLEY, R. L. N83-27767
N83-27788
STOKES, P. A. N83-27527
STOKES, R. H. N83-27731
STOPPLER, W. N83-27217
STOVALL, J. E. N83-27764
STOWERS, I. F. N83-27390
STRAIGHT, D. M. N83-26839
STREETS, D. G. N83-27508
STRICKLAND, G. N83-27040
STRIKWERDA, J. C. N83-27203
STRIZAK, J. P. N83-27011
STROBEL, B. N83-26935
STROHKORB, G. A. N83-27259
STRONG, L. N83-27586
STRUCKMEYER, H. N83-27374
STRUM, M. J. N83-27005
STRUNCE, R. R., JR. N83-26881
STUART, B. N83-26987
STUDOR, G. F., JR. N83-26908
STULL, F. D. N83-26791
STUMPF, R. N83-26838
STYLES, G. A. N83-26979
SU, S. Y. W. N83-27916
SUBBARAO, K. N83-27063
SUGIURA, M. N83-27519
SUIDAN, M. T. N83-27078
SULLIVAN, D. J. N83-27777
SULLIVAN, M. R. N83-26874
SULLIVAN, T. J. N83-27531
SULLIVAN, W. G. N83-27470
SUMMERS, L. T. N83-27005
SUN, H. N83-27848
N83-27849
SUNDIN, K. G. N83-27272
N83-27274
SUTER, J. N83-27772
SUZUKI, N. N83-27365
SVENSSON, U. N83-27174
N83-27340
N83-27515
N83-27532
SWAIN, P. H. N83-27285
SWANSON, P. N. N83-26858
SWENSON, D. A. N83-27764
SWIATECKI, W. J. N83-27896
SWINDEMAN, R. W. N83-27010
N83-27011
SWITENDICK, A. C. N83-27884
SZABO, M. N83-27511
SZEDON, J. R. N83-27416
SZOELLOESI-NAGY, A. N83-27341
N83-27342
SZUSZCEWICZ, E. P. N83-27100
SZYMCZYK, J. M. N83-27193

T

TAKAHASHI, T. N83-27702
TAKANAKA, M. N83-27787
TAKATA, M. L. N83-27860
TAKESHITA, T. N83-27396
TALAPATRA, D. C. N83-26910
N83-26911
TALIPSKY, R. N83-27290
TALLEY, B. N83-27841
TALWALKAR, A. T. N83-27899
TANABE, E. N83-27765
TANAHASHI, S. N83-27855
TANAKA, J. N83-27229
N83-27761
TANZAWA, T. N83-26945
N83-26962
TAORMINA, F. A. N83-26888
TARBELL, S. A. N83-27562
TARTARUGA, G. N83-27118
TARVER, C. M. N83-27041
TATE, R. E. N83-27446
TAYLOR, J. N83-26912
TAYLOR, L. L. N83-26952
TAYLOR, L. S. N83-27724
TAYLOR, L. W., JR. N83-26887
TAYLOR, R. C. N83-27086
TAYLOR, S. S. N83-27531
TEEGARDEN, B. J. N83-27933
TEMPS, F. N83-26985
TENNEY, R. R. N83-27683
N83-27684
N83-27689
TENNY, D. R. N83-26866
TESCH, P. A. N83-27584
TEUFEL, L. W. N83-27805
THEMELIS, M. P. N83-27427
THODE, L. E. N83-27754
THOMAS, A. J. N83-27741
THOMAS, G. N83-27347
THOMAS, G. H. N83-27802
THOMAS, J. F. N83-27243
THOMAS, L. N83-26848
THOMAS, M. N83-26877
THOMAS, R. R. N83-27569
THOMEE, V. N83-27672
THOMPSON, J. L. N83-27635
THOMPSON, M. O. N83-27205
THOMPSON, T. K. N83-27838
THOMS, R. L. N83-27465
THORISSON, H. N83-27675
THORNHILL, R. R. N83-27293
THORSNESS, C. B. N83-27450
THORSON, M. R. N83-27628
THOULESS, M. D. N83-27268
THRIFT, P. N83-27640
TIETJEN, G. L. N83-27335
TIKHONCHUK, V. S. N83-27574
TILLER, F. D. N83-27187
TOBUREN, L. H. N83-27823
TOJYO, E. N83-27786
TOKUDA, N. N83-27787
N83-27789
TOLAN, J. S. N83-27835
TOLIVAR, A. F. N83-26880
TOMAN, J. J. N83-26954
TOMKINS, M. N83-27301
TOMLINSON, G. N83-27406
TONELLI, G. N83-27571
TORGESON, D. R. N83-26979
TRAEGER, R. K. N83-27395
TRASK, R. P. N83-27559
TRIVEDI, N. B. N83-27521
TROUT, R. E. K. N83-27760
TRUHLAR, D. G. N83-26973
TRUJILLO, A. N83-27601
TSUBOI, J. N83-27232
TSUKADA, K. N83-27743
TUELLER, J. N83-27933
TUFTS, D. W. N83-27646
TUPITSINA, Y. Y. N83-27573
TURCOTTE, R. N83-27392
TURK, W. V. N83-27420
TURKINGTON, B. N83-27162
N83-27163
TURNER, J. D. N83-26881
TURNER, P. R. N83-26920
TURNER, R. B. N83-27740
N83-27742
TURNER, R. R. N83-27504

U

UDINTSEV, N. A. N83-27576
UEDA, N. N83-27787
ULRICH, C. E. N83-27207
UNDEN, G. N83-27142
UNGRIN, J. N83-27726
N83-27736
N83-27740
N83-27742
N83-27763
UNKEL, W. N83-27226
URALIL, F. S. N83-27079
URAMOTO, J. N83-27857
URISH, G. N83-27138
USERY, E. L. N83-27322

V

VACHINO, E. E. N83-27547
VAENNMAN, K. N83-27273
VANBRUNT, V. N83-27897
VANBUSSEL, G. J. W. N83-27476
VANDENBERG, L. N83-27266
VANDERMAST, V. C. N83-27377
N83-27378
VANDEROSTYNE, C. N83-26964
VANDERSANDE, J. B. N83-27008
VANDYKE, P. N83-27390
VANHOLTEN, T. N83-27476
VANKUIK, G. A. M. N83-27476
VANKUREN, J. T. N83-26799
VANROOYEN, M. H. N83-27614
VANWYK, C. J. N83-27617
VARHOLA, J. N83-27287
N83-27288
VEA, R. N83-27620
VENGROV, R. M. N83-27747
VENKAT, R. S. N83-26837
VENKATESWAR, R. N83-26967
VENNERI, F. N83-27858
VENTER, J. C. N83-27478
VENTURI, R. N83-27571
VERDERBER, R. R. N83-27104
N83-27109
VETTER, O. J. N83-26949
VEYO, S. E. N83-27173
VIDULICH, M. N83-27589
VIETS, H. N83-26808
VIRTANEN, J. N83-27198
VIVIANO, P. J. N83-27678
VOKES, R. A. N83-27763
VOLKOVA, L. P. N83-27573
VONCHOSSY, R. N83-27692
VONDERSCHMITT, H. N83-27729
N83-27781
VONHOLLE, W. G. N83-27042
VONTOBEL, G. N83-27528

W

WADDINGTON, D. N83-27386
WAGNER, H. G. N83-26985
WAIBEL, A. N83-27094
WALBERG, G. D. N83-27200
WALKER, J. P. N83-27546
WALKER, P. L. N83-27046
WALLACH, R. W. N83-27591
WALLIN, A. N83-26836
WALSH, J. M. N83-27038
WALTHALL, C. L. N83-27311
WAMBAUGH, J. O. N83-27079
WAMBSGANSS, M. W. N83-27264
WAMPLER, W. R. N83-27814
WANG, H. T. M. N83-27185
WANG, J. M. N83-27869
WANG, J. S. N83-27135
WANG, S. J. N83-26880
WANGLER, T. P. N83-27731
N83-27788
WARD, D. N83-27711
WARD, D. S. N83-27456
WARNECKE, H. J. N83-27902
WASSERBAUER, C. A. N83-27793
WATSON, J. M. N83-27767
N83-27788
WATTENDORF, F. N83-26788
WEBB, J. N83-26847
WEBB, J. A. N83-27600
WEICHEL, R. L. N83-27531
WEIDMAN, R. S. N83-27880
WEINBERGER, P. J. N83-27617
WEINSTEIN, S. D. N83-27456
WEISSMAN, S. H. N83-26953
WEISSMANN, M. A. N83-27145
WELCH, D. O. N83-26981
WELCH, R. N83-27322

WELLS, A. A. N83-27216
WELLS, W. L. N83-27151
WENNERSTROM, A. J. N83-26798
N83-27154
WERNER, J. R. N83-27923
WERNER, P. N83-27075
WERNER, S. D. N83-27534
WEST, G. T. N83-27037
WESTCOTT, C. N83-27014
WHALEN, J. F. N83-27001
WHIPKEY, R. R. N83-26822
WHITAKER, C. N83-27398
WHITE, C. W. N83-27127
WHITE, R. N83-27844
WHITE, T. N83-26912
WHITE, W. F. N83-27188
WHITEMAN, C. D. N83-27509
WHITTLE, D. P. N83-27007
WICKENS, C. D. N83-27589
WICKRAMASINGHE, N. C. N83-27940
N83-27941
N83-27942
N83-27944
WILDER, S. E. N83-27150
WILKINSON, J. H. N83-27695
WILLIAMS, D. E. N83-27014
WILLIAMS, W. J. N83-26834
WILLIS, J. B. N83-26824
WILLS, J. A. B. N83-27535
WILSON, W. E. N83-27823
WILSON, W. I. N83-27500
N83-27501
WINER, A. M. N83-27035
WINET, H. N83-27155
WINKLER, H. E. N83-27577
WINKLER, J. D. N83-27349
WINKLER, V. N83-27844
WINNINGHAM, J. D. N83-27519
WINTERS, W. N83-27542
WINTERS, W. S. N83-27458
WISE, D. L. N83-27039
WOHL, J. G. N83-27595
WOHN, K. N83-27640
WOLFOWICZ, W. N83-27120
N83-27121
N83-27122
WONG, C. Y. N83-27818
WONG, S. H. N83-27500
N83-27501
WOO, K. E. N83-26893
WOOD, J. R. N83-26817
N83-26914
WOODBURY, L. B. N83-27680
WOODRUFF, T. O. N83-27880
WOODS, A. A., JR. N83-26873
WOODWARD, M. H. N83-27625
WOODWARD, R. P. N83-27794
WOODWARD, W. A. N83-27297
WRAY, W. O. N83-27420
WRIGHT, H. E. N83-26799
WRIGHT, J. E. N83 27584
WRIGHT, K. A. N83-27402
WRIGHTON, F. M. N83-27473
WU, C. K. N83-27444
WU, J. J. N83-26803
WU, V. C. N83-27578
WU, Z. N83-27848
N83-27849
WYNN, M. C. N83-27447
WYSS, R. K. N83-27103

Y

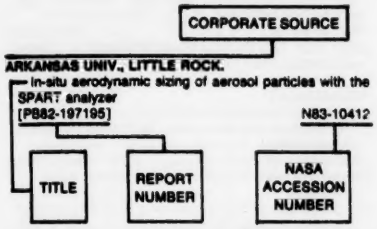
YAMADA, S. N83-27787
N83-27789
N83-27790
YAMAGUCHI, T. N83-27232
YAMAGUCHI, Y. N83-27721
YAMAZAKI, Y. N83-27721
N83-27723
YANG, C. I. N83-27264
YANG, C. Y. N83-27344
YANG, F. C. N83-27007
YAO, J. T. P. N83-27080
N83-27082
YATES, G. J. N83-27850
YONAMURA, U. N83-27365
YONAS, G. N83-27863
YORK, R. C. N83-27779
YOSHIDA, K. N83-27786
YOSHIDA, Y. N83-27068
YOSHIMURA, M. N83-27394
YOUNG, H. C. N83-27050
YOUNG, J. P. N83-27817
YOUNG, L. E. N83-26903
YU, S. N83-27842
YUCUIS, W. A. N83-27597
YUYANG, S. N83-26927

Z

ZACKSENHOUSE, M. N83-27226
ZAKHARENKOV, Y. A. N83-27867
ZEVELY, J. N83-26957
ZICK, M. N83-27070
ZIEGLER, J. F. N83-27706
ZIMBARDO, P. G. N83-27596
ZIN, W. C. N83-27025
ZINKANN, G. N83-27730
ZIPOY, D. N83-27518
ZIRIN, H. N83-27948
ZITKA, B. N83-27128
ZITO, F. N83-27571
ZODI, A. M. N83-27948
ZUTECK, M. N83-27347
ZWICKL, R. D. N83-27946

CORPORATE SOURCE INDEX

Typical Corporate Source Index Listing



Listings in this index are arranged alphabetically by corporate source. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The NASA accession number denotes the number by which the citation is identified. The titles are arranged under each corporate source in ascending accession number order.

A

ACADEMY OF SCIENCES (USSR), MOSCOW.
Gamma-gun in the center of the galaxy
[REPT-757] N83-27945

ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT, NEUILLY-SUR-SEINE (FRANCE).
AGARD Bulletin: Meetings, publications, membership
[AGARD-BUL-83/1] N83-26786

AERONAUTICAL RESEARCH INST. OF SWEDEN, STOCKHOLM.
Wind tunnel investigation of separated flow over an afterbody in supersonic axisymmetric stream utilizing one-component laser-Doppler-velocimetry
[FFA-TN-1983-10] N83-26826

AERONAUTICAL RESEARCH LABS., MELBOURNE (AUSTRALIA).
Programs for the transonic wind tunnel data processing installation. Part 10: Six component measurements updated
[AD-A122248] N83-26824

AEROSPACE CORP., EL SEGUNDO, CALIF.
Combustion losses in automotive spark ignition and diesel engines
[DE83-006015] N83-27244
Assessment of water addition to spark ignition engines
[DE83-006013] N83-27245

AEROSPACE RESEARCH LABS., WRIGHT-PATTERSON AFB, OHIO.
Improved analytical and numerical techniques for calculating explosions and implosions N83-26801

AGBABIAN ASSOCIATES, EL SEGUNDO, CALIF.
Seismic response of port and harbor facilities
[PB83-145490] N83-27534

AIR FORCE AERO PROPULSION LAB., WRIGHT-PATTERSON AFB, OHIO.
Coaxial dump combustor investigations N83-26791
The use of vortex generators as inexpensive compressor casing treatment N83-26798
A one-dimensional procedure for estimating the performance of ejector nozzles N83-26806
Thermal dissociation of diatomic molecules N83-26810
Vibration analysis of a spinning disk using image derotated holographic interferometry N83-26811

AIR FORCE ENVIRONMENTAL TECHNICAL APPLICATIONS CENTER, SCOTT AFB, ILL.
Revised Uniform Summary of Surface Weather Observations (RUSSWO)
[AD-A122719] N83-27543

AIR FORCE FLIGHT DYNAMICS LAB., WRIGHT-PATTERSON AFB, OHIO.
The numerical solution of pressure oscillations in an open cavity N83-26793
Boundary-layer transition on blunt, slender cones at hypersonic Mach numbers N83-26794
Degradation of a laser beam by a turbulent jet N83-26799
Highlights of an ejector analysis N83-26804
Advances in ejector technology: A tribute to Hans von Ohain's vision N83-26805
Statistical experimental designs in computer aided optimal aircraft design N83-26812
MTBF confidence bounds based on MIL-STD-781C fixed-length test results N83-26813

AIR FORCE INST. OF TECH., WRIGHT-PATTERSON AFB, OHIO.
The Bojarski-Lewis identity for elastic wave scattering N83-26809
Computation of incompressible potential flow over an airfoil using a high order aerodynamic panel method based on circular arc panels
[AD-A124896] N83-26825
Investigation of a third order baro-damped verticle channel of INS
[AD-A124882] N83-26828
Dynamic characteristics of aerial refueling systems
[AD-A124770] N83-26830
Survivability of interdiction aircraft: Sensitivity to terrain following, command altitude, velocity and electronic counter measures
[AD-A124870] N83-26833
Application of the vortex-lattice method to propeller performance analysis
[AD-A124837] N83-26840
High-gain error actuated flight control systems for continuous linear multivariable plants
[AD-A124871] N83-26848
Post-flight trajectory reconstruction of a maneuvering reentry vehicle from radar measurements
[AD-A124805] N83-26852
Estimation of launch vehicle performance parameters from 2 orbiting sensors
[AD-A124802] N83-26907
An experimental analysis in modern modal control
[AD-A124839] N83-26908
Optimizing the space transportation system
[AD-A124920] N83-26913
Body flap heat transfer data from space shuttle orbiter entry flight test maneuvers
[AD-A124844] N83-26914
Numerical computation of the matrix Riccati equation for heat propagation during space shuttle reentry
[AD-A124873] N83-26916
Flame optimization for the spectroscopic analysis of the chemiluminescence from lead oxide
[AD-A124825] N83-26937
Performance of sequentially decoded long constraint length codes for a satellite communications link in a scintillated channel
[AD-A124814] N83-27093
Enhanced tracking of airborne targets using a correlator-Kalman filter
[AD-A124884] N83-27097
The performance of a PN spread spectrum receiver preceded by an adaptive interference suppression filter
[AD-A124903] N83-27098
Restoration of pulse position modulated signal in a high noise environment
[AD-A124902] N83-27099
Experimental investigation of the mixing of highly swirling flows
[AD-A125249] N83-27160
Mathematical modeling of black-and-white chromogenic image stability
[AD-A125248] N83-27166
Information theoretic detection of objects embedded in cluttered aerial scenes
[AD-A124975] N83-27167
Analysis of progressive collapse of complex structures
[AD-A125266] N83-27260
The simulation of a passive solar energy system
[AD-A124900] N83-27354
A finite element analysis of the creep response of lumbar intervertebral joints in the Rhesus monkey
[AD-A124740] N83-27570
Comparative analysis of positive and negative lateral acceleration on isometric fatigue
[AD-A124752] N83-27587
A model for human visual processing which explains perceptions of motion-after-effects
[AD-A124842] N83-27588
Computer simulation of a multiaxis air-to-air tracking task using the optimal pilot control model
[AD-A125302] N83-27597
FORTRAN based linear programming for microcomputers
[AD-A124804] N83-27605
Design of a prototype universal network interface device using INTEL 8086 and 8089 16-bit microprocessors
[AD-A124834] N83-27606
Development of a design automation graphics work station
[AD-A124824] N83-27618
Development of computer performance evaluation tools for VAX-11/780 computers
[AD-A124904] N83-27619
The EZDRAW: An interactive computer graphics program to design bar, line or pie graphs
[AD-A124901] N83-27620
An interactive and automated software development environment
[AD-A124872] N83-27623
A secure computer network
[AD-A124820] N83-27634
A new approach for solving simultaneous resource possession problems in closed queueing networks
[AD-A124877] N83-27637
Multiple model adaptive estimation for space-time point process observations
[AD-A124827] N83-27641
A comparison of the finite beat conduction equation with temperature dependent conductivity
[AD-A124918] N83-27647
A modified Kolmogorov-Smirnov, Anderson-Darling, and Cramer-Von Mises test for the gamma distribution with unknown location and scale parameters
[AD-A124841] N83-27678
A new goodness of fit test for the uniform distribution with unspecified parameters
[AD-A124835] N83-27680
A study of multivariate statistical analysis techniques for computer performance evaluation
[AD-A124899] N83-27681
Heat transfer/boundary layer investigation of heating discrepancies in wind tunnel testing of orbiter insulating articles
[AD-A124803] N83-27893
Design of a distributed data base management system for use in the AFIT Digital Engineering Laboratory
[AD-A124821] N83-27905
Development of a query processor for a back-end multiprocessor relational database computer
[AD-A124885] N83-27907
Concepts evaluation model V input-data system
[AD-A124891] N83-27908
The performance measurement of a relational database system using monitoring and modeling techniques
[AD-A124919] N83-27910
A backend data base system for the Eglin computer network
[AD-A124908] N83-27911
The continued design and implementation of a relational database system
[AD-A124927] N83-27912
Automatic threshold design for a bound document scanner
[AD-A125316] N83-27913
Correlating radio emissions with visible emissions from individual solar active regions
[AD-A124892] N83-27949

AIR FORCE SYSTEMS COMMAND, EDWARDS AFB, CALIF.
Autonomous spacecraft design and validation methodology handbook
[NASA-CR-172678] N83-26920

Technology needs for Air Force autonomous spacecraft
[NASA-CR-172677] N83-26921

AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AFB, OHIO.
Aeronautical Knowledge (selected articles)
[AD-A123935] N83-26925
First flight test of Chinese electron rocket is successful N83-26926
The plasma powerplant N83-26927
Analytical design for internal burning star grains of solid rockets
[AD-A124826] N83-27032
A model for forecasting the country's general use data transmission network
[AD-A124847] N83-27095
Communications today (selected articles)
[AD-A124795] N83-27096
Changes in the states of aggregation on the electrodes during condensed discharges
[AD-A124780] N83-27126
Switching devices
[AD-A124801] N83-27129
A visit to the Computer Science Department
[AD-A124855] N83-27607
The X-Y digital plotter as an output unit for the CDRA 1325 digital computers
[AD-A124799] N83-27608

AIR FORCE WRIGHT AERONAUTICAL LABS., WRIGHT-PATTERSON AFB, OHIO.
A collection of papers in the aerospace sciences
[AD-A122667] N83-26787
Electrofluid dynamics: The role of Hans von Ohain N83-26788
The energy balance in axisymmetric steady compressible swirl flows with closed streamlines N83-26789
Constant parameter two component channel flows N83-26797
Experimental analysis of the performance of an annular peripheral jet vehicle in ground effect
[AD-A124949] N83-26832
Revision of the shock loss re-estimation procedure of Program UDO300 utilizing a three-dimensional shock model
[AD-A124928] N83-27154
General relations for exact and inexact involute bodies of revolution
[AD-A124849] N83-27201

AIRCO TEMESAL, BERKELEY, CALIF.
Production techniques for high volume sputtered films N83-27367

AIRESEARCH MFG. CO., TORRANCE, CALIF.
Phase 2 Brayton/Rankine 10-ton gas-fired space-conditioning system
[DE82-016367] N83-27355

AKRON UNIV., OHIO.
Role of amines in adhesion of polybutadiene to glass substrates. 1: Reactions of amines during peroxide curing of polybutadiene
[AD-A121685] N83-27027
Role of amines in adhesion of polybutadiene to glass substrates. 4: The effect of amine structure and concentration on the strength of adhesion
[AD-A121686] N83-27028

ALPHATECH, INC., BURLINGTON, MASS.
Modeling human decision processes in command and control
[AD-A125218] N83-27595

AMANA REFRIGERATION, INC., IOWA.
Engineering and manufacture of a high-efficiency, automatic defrosting refrigerator-freezer
[DE82-017480] N83-27065

AMERICAN CYANAMID CO., STAMFORD, CONN.
Materials for transparent heat mirror coatings N83-27360

AMES LAB., IOWA.
Effects of magnetic impurities on the apparent diffusion coefficient of hydrogen in metal hydrides deduced from NMR
[DE82-019124] N83-26979
Aluminum nitride thin film and composite bulk wave resonators
[DE82-019303] N83-27135
The rare earth sulfides R2S/sub 3-x/(R = Sc, Er and Lu) as high temperature thermoelectric elements
[DE82-016382] N83-27396
An NMR study of hydrogen diffusion in metal hydrides containing parametric impurities
[DE83-004859] N83-27890

APPLIED ENERGY SYSTEMS, INC., CAPE CANAVERAL, FLA.
Load leveling on industrial refrigeration systems
[DE82-902079] N83-27066

ARGONNE NATIONAL LAB., ILL.
Analysis of a failed spent-char transfer line from the IGT HYGAS coal-gasification pilot plant
[DE82-014906] N83-26947
Fast-neutron total and scattering cross sections of elemental palladium
[DE82-019475] N83-27001
Fluidelastic instability in shell and tube heat exchangers: A framework for a prediction method
[DE83-007812] N83-27264
Cost/design study and fabrication/testing of a 300-W gas-recombination device for utility lead-acid cells
[DE82-019600] N83-27468
Sulfur control in fluidized-bed combustors: Methodology for predicting the performance of limestone and dolomite sorbents
[DE83-007658] N83-27500
Sulfur control in fluidized-bed combustors: Methodology for predicting the performance of limestone and dolomite sorbents. Addendum. Compilation of sorbent performance data from atmospheric fluidized-bed combustors
[DE83-007659] N83-27501
Fluidized-bed combustion: A review of environmental aspects
[DE82-021238] N83-27506
Implications of emerging environmental-control technologies for air-pollution regulations
[DE83-005901] N83-27508
National Energy Software Center: Compilation of program abstracts
[DE83-001550] N83-27630
Recent developments in algorithms and software for trust-region methods
[DE83-006276] N83-27667
Eigenvalue problem for Hermitian matrices with time-reversal symmetry
[DE83-005629] N83-27695
Interactions of fast molecular ions traversing thin foils: The contribution from field-ionized Rydberg atoms in measurements on Convoy electrons N83-27720
Status of the Argonne superconducting-linac heavy-ion booster N83-27730
Low frequency RFQ linacs for heavy ion fusion N83-27767
Focussing considerations in the race track microtron and double-sided microtron N83-27774
Longitudinal beam optimization of the Argonne superconducting heavy-ion liner accelerator N83-27780
A 750 keV RFQ linac for the AGS polarized proton program N83-27788
Note on the elastic-scattering of few-MeV neutrons from elemental calcium
[DE82-019476] N83-27827
Fast-neutron scattering cross sections of elemental silver
[DE82-019477] N83-27883

ARIZONA STATE UNIV., TEMPE.
Electron emission characteristics of tungsten alloys: Moe 492
[DE83-006774] N83-27006
Hydraulic air compressor as part of an ultra low-head hydropower system
[DE82-018428] N83-27425

ARIZONA UNIV., TUCSON.
A note on adaptive wind tunnels with imperfect control N83-26792

ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, ABERDEEN PROVING GROUND, MD.
Sensitivity analysis for premixed, laminar, steady-state flames
[AD-A123866] N83-26938

ARMY COLD REGIONS RESEARCH AND ENGINEERING LAB., HANOVER, N. H.
The brine zone in the McMurdo Ice Shelf, Antarctica
[AD-A124516] N83-27558

ARMY ELECTRONICS RESEARCH AND DEVELOPMENT COMMAND, FORT MONMOUTH, N. J.
Electrochemical studies at carbon black paste electrodes containing cupric chloride additive
[AD-A125276] N83-26942

ARMY MOBILITY EQUIPMENT RESEARCH AND DEVELOPMENT COMMAND, FORT BELVOIR, VA.
Plating wastes survey
[AD-A125230] N83-27480

ARMY RESEARCH AND TECHNOLOGY LABS., MOFFETT FIELD, CALIF.
Calculation of boundary layers near the stagnation point of an oscillating airfoil
[NASA-TM-84305] N83-27148

ARMY RESEARCH INST. OF ENVIRONMENTAL MEDICINE, NATICK, MASS.
Effects of sleep deprivation on thermoregulation during exercise
[AD-A124982] N83-27580
Sleep deprivation depresses thermoregulatory responses to physical exercise
[AD-A125062] N83-27581
Recovery from short term intense exercise: Its relation to capillary supply and lactate release
[AD-A124965] N83-27584
Angular specificity and test mode specificity of isometric and isokinetic strength training
[AD-A124976] N83-27585
A linearized, time dependent model of the heat transfer and thermoregulatory responses occurring upon immersion in cold water
[AD-A124972] N83-27586

ARMY TEST AND EVALUATION COMMAND, ABERDEEN PROVING GROUND, MD.
Test operations procedures
[AD-A124797] N83-27092

ATLAS CORP., SANTA CRUZ, CALIF.
Proceedings of the Sixth Annual Geothermal Conference and Workshop
[DE83-901135] N83-27372

ATOMIC ENERGY OF CANADA LTD., CHALK RIVER (ONTARIO).
Energy loss of heavy ions as a function of target thickness: Ne yields C N83-27711
Low energy 100 percent duty factor Alvarez linacs at Chalk River N83-27726
A beam cavity interaction computer code for linacs N83-27735
Design and constraints for the ZEBRA injector, RFQ and DTL N83-27736
A microprocessor-controlled bead puller for RF cavity measurements N83-27738
Construction of a high-power RF resonant test load N83-27740
Brazing techniques and alloys for accelerator RF components N83-27742
Beam dynamics studies of high current RFQ and DTL tanks N83-27756
Design considerations for a developmental high power coupling loop to drive a resonant load N83-27762
Post coupler studies for Alvarez tanks to be used for high power or variable energy N83-27763
Ion source development and injector design for Zebra N83-27776

ATOMIC ENERGY RESEARCH ESTABLISHMENT, HARWELL (ENGLAND).
Technique and applications of X-ray photoelectron spectroscopy
[AERE-R-10803] N83-26988
A statistical approach to the study of localized corrosion
[AERE-R-10832] N83-27014
The beneficiation of power station coal ash and its use in heavy clay ceramics
[AERE-R-10806] N83-27031
Detectability of defects by thermal non-destructive testing
[AERE-R-10802] N83-27250
A study of elastic-plastic fracture parameters through the thickness of fracture toughness specimens using silicone-rubber crack impressions
[AERE-R-10815] N83-27280

AUBURN UNIV., ALA.
Error analysis and prevention of cosmic ion-induced soft errors in static CMOS RAMS
[DE82-018967] N83-27610

AUTOMATION INDUSTRIES, INC., SILVER SPRING, MD.
Solar-energy-system performance evaluation. San Anselmo School, San Jose, California, April 1981-March 1982
[DE82-020142] N83-27422

B

BATTELLE COLUMBUS LABS., OHIO.
Thermophysical properties of coal liquids
[DE82-013366] N83-26967
Development of improved plastic piping materials and systems for fuel gas distribution
[PB83-161109] N83-27079
Research options for the development of sensors to measure the thermal state of solid steel bodies
[DE83-007253] N83-27191
Evaluation of biomass systems for electricity generation
[DE82-901865] N83-27436

BATTELLE PACIFIC NORTHWEST LABS., RICHLAND, WASH.
Siting guidelines for utility application of wind turbines
[DE83-007428] N83-27393
Ionization by fast charged particles
[DE82-014849] N83-27823

BDM CORP., ALBUQUERQUE, N. MEX.
Collector trade-off study for BDM PRDA-35 application
[DE82-013532] N83-27434

BDM CORP., MONTEREY, CALIF.
An analysis of the Wyngaard-LeMone model of refractive index and micrometeorological structure functions at the top of a turbulent mixed layer
[AD-A123986] N83-27548

BECHTEL CORP., SAN FRANCISCO, CALIF.
Geothermal steam separator evaluation (RP1672-1)
N83-27377
Geothermal scale control by crystallization (RP15[illegible]-2)
N83-27378

BENDIX CORP., KANSAS CITY, MO.
Continuous cable processing by the physical vapor deposition technique
[DE83-006011] N83-27003

BENDIX FIELD ENGINEERING CORP., GRAND JUNCTION, COLO.
Statistical Techniques Applied to Aerial Radiometric Surveys (STAARS): Application of the Huber M-estimator to aerial radiometric data for the identification of host and source areas for uranium deposits
[DE82-018199] N83-27335

BIPHASE ENERGY SYSTEMS, INC., SANTA MONICA, CALIF.
Wellhead power production with a rotary separator turbine (RP 1196) N83-27376

BOEING AEROSPACE CO., SEATTLE, WASH.
Cadmium sulfide/copper ternary heterojunction cell research
[DE83-000997] N83-27451

BOEING CO., SEATTLE, WASH.
Solar project description: South Bridge Towers no. 6 multi-family cooperative, New York City, New York
[DE82-019252] N83-27421

BOEING COMMERCIAL AIRPLANE CO., SEATTLE, WASH.
Selected advanced aerodynamics and active controls technology concepts development on a derivative B-747 aircraft
[NASA-CR-3295] N83-26831
Intermediate photovoltaic system application experimental operational performance report for Newman Power Station, El Paso, Texas for September 1982, volume 15
[DE83-006845] N83-27459
Intermediate photovoltaic system application experiment operational performance report for Beverly High School, Beverly, Massachusetts for August 1982, volume 12
[DE83-007092] N83-27460

BOEING COMPUTER SERVICES, INC., SEATTLE, WASH.
Intermediate photovoltaic system application experiment operational performance. Executive summary for Newman Power Station, El Paso, Texas
[DE82-019965] N83-27407
Intermediate photovoltaic system application experiment operational performance. Executive summary for Oklahoma Center for Science and Arts, Oklahoma City, Oklahoma
[DE82-019964] N83-27408
Intermediate photovoltaic system application experiment operational performance. Executive summary. Volume 6: Beverly High School, Beverly, Massachusetts
[DE82-015660] N83-27409
Intermediate photovoltaic system application experiment operational performance. Executive summary for Beverly High School, Beverly, Massachusetts
[DE82-019967] N83-27410
Intermediate photovoltaic system application experiment operational performance. Executive summary for CDC Light Manufacturing Building, San Bernardino, California
[DE82-019962] N83-27411
Intermediate photovoltaic system application experiment operational performance. Executive summary for Mississippi County Community College, Blytheville, Arkansas
[DE82-019966] N83-27412
Intermediate photovoltaic system application experiment operational performance report, for April 1982. Volume 2: For Mississippi County Community College, Blytheville, Arkansas
[DE83-006446] N83-27439
Intermediate photovoltaic system application experiment operational performance report, for September 1982. Volume 5: For Oklahoma Center for Science and Arts
[DE83-006448] N83-27440
Intermediate photovoltaic system application experiment operational performance report, for October 1982. Volume 16: For Lovington Square Shopping Center, Lovington, New Mexico
[DE83-006447] N83-27441
Intermediate photovoltaic system application experiment operational performance report. Volume 16: For Newman Power Station, El Paso, Texas for October 1982
[DE83-006445] N83-27442
Intermediate photovoltaic system application experiment operational performance report for G. N. Wilcox Hospital, Kauai, Hawaii for September 1982, volume 5
[DE83-006843] N83-27454

BOEING MILITARY AIRPLANE DEVELOPMENT, SEATTLE, WASH.
Compression and compression fatigue testing of composite laminates
[NASA-CR-168023] N83-26928

BONN UNIV. (WEST GERMANY).
Finite element approximation of the nonstationary Navier-Stokes problem. Part 2: Stability of solutions and error estimates uniform in time
[PREPRINT-558-PT-2] N83-27179

BOOZ-ALLEN AND HAMILTON, INC., BETHESDA, MD.
Demonstration and evaluation of gas turbine transit buses
[NASA-CR-165528] N83-27926

BRANDEIS UNIV., WALTHAM, MASS.
Components of mental imagery representation
[AD-A124616] N83-27591

BRIGHAM YOUNG UNIV., PROVO, UTAH.
Prediction and measurement of optimum operating conditions for entrained coal-gasification processes
[DE82-015612] N83-26972

BRITISH GAS CORP., LONDON (ENGLAND).
Chromatography of coal derived oil
[BLL-T5991/BG/MRA14684/82] N83-26935

BRITISH LIBRARY LENDING DIV., BOSTON SPA (ENGLAND).
Assessment of the quality of bearing steel from its inclusion content
[BLL-M-26906-(5828.4)] N83-26991
The beneficial effect of zirconium and calcium when jointly microalloyed with high speed steels
[BLL-M-26914-(5828.4)] N83-26992
Use of the regularization method for designing the equilibrium system of a Tokamak reactor having a specified plasma geometry
[BLL-CTO-2117-(9091.9F)] N83-27851
Linear problem of inductor synthesis for a Tokamak thermonuclear apparatus
[BLL-CTO-2116-(9091.9F)] N83-27852

BROOKHAVEN NATIONAL LAB., UPTON, N. Y.
Flash pyrolysis and hydropyrolysis of biomass
[DE82-015807] N83-26951
Applications of resonance-averaged gamma-ray spectroscopy with tailored beams
[DE82-018098] N83-26955
Thermal Desorption Spectroscopy (TDS) of hydrogen from niobium
[DE82-012024] N83-26981
Hydrogen derived from ammonia: Small-scale costs
[DE82-012720] N83-27040
Research strategy to permit greater utilization of domestic fossil energy resources
[DE82-018339] N83-27405
Thermal performance of a double-envelope house
[DE82-018061] N83-27417
Organic Air Pollutants: Setting Priorities for Long Term Research Needs
[DE83-005997] N83-27507
First results on BNL H- MEQALAC N83-27746
Transverse coherent instabilities and a dipole feedback damper for coexisting coasting and bunched beams
[DE82-016613] N83-27869

BROWN UNIV., PROVIDENCE, R. I.
Multiaxial creep of 2618 aluminum under proportional loading steps
[AD-A125023] N83-26997
The 48 hour multiaxial creep and recovery of 2618 aluminum alloy at 200C
[AD-A124993] N83-26998
Research on nonlinear dynamical systems
[AD-A125235] N83-27696

C

CABOT CORP., KOKOMO, IND.
Hardfacing materials and processes for valve applications N83-27221

CALIFORNIA DEPT. OF WATER RESOURCES, SACRAMENTO.
Geothermal energy and the state water project
N83-27374

CALIFORNIA INST. OF TECH., PASADENA.
Electronic system for high power load control
[NASA-CASE-NPO-15358-1] N83-27126

CALIFORNIA UNIV., BERKELEY.
Dew points of hot gases from coal-gasification processes
[DE82-016337] N83-26964
A new class of steels for thick-wall pressure vessels
[DE83-004101] N83-26999
Further study of the earthquake response of a broad cylindrical liquid-storage tank model
[PB83-147744] N83-27277
Development of techniques for producing static strata maps and development of photointerpretive methods based on multitemporal LANDSAT data
[E83-10081] N83-27284
Identifiability and estimation in random translations of marked point processes
[AD-A125313] N83-27652

CALIFORNIA UNIV., BERKELEY. LAWRENCE BERKELEY LAB.
Molecular beam studies of primary photochemical processes
[DE83-006190] N83-26946
Analysis of flame propagation
[DE82-018582] N83-26948
Molecular ingredients of heterogeneous catalysis
[DE82-018584] N83-26950
Convolution techniques in analytical electrochemistry
[DE82-018531] N83-26954
Aging response of a welded iron-based superalloy
[DE83-005856] N83-27005
High-temperature corrosion of iron in sulfur-containing atmosphere
[DE83-006965] N83-27007
Proceedings of the Lightning-Electromagnetic Compatibility Conference
[DE83-005707] N83-27104
EMI measurements of lightning systems N83-27109
Traveling-wave tube amplifier characteristics study for stochastic beam-cooling experiments
[DE83-005867] N83-27132
Heavy-ion-spectrometer system
[DE82-017049] N83-27190
Propagation of creep cracks by cavitation in fine-grained materials
[DE83-005869] N83-27268
Transparent heat-mirror materials and deposition technology
[DE83-007042] N83-27357
Durable innovative solar optical materials: The international challenge N83-27358
Ammonia-air fuel cell power plant systems analysis
[DE82-018914:] N83-27464
Status of the DOE battery and electrochemical technology program, 3
[DE82-018912] N83-27469
Biomedical applications of digital autoradiography with a MWPC
[DE82-017055] N83-27571
Beam dynamics in heavy ion induction linacs
N83-27750
Loop coupling to a Radio Frequency Quadrupole resonator (RFQ) N83-27766
Review of induction linacs N83-27769
Low-cost megawatt RF power sources for linear accelerators to 70MHz and above
[LBL-13024] N83-27784
An analytical solution for the electrical properties of a Radio Frequency Quadrupole (RFQ) with simple vanes
N83-27785
New formulation of the RFQ radial matching section
N83-27789
Buncher section optimization of heavy ion RFQ linacs
N83-27790
The role of rotational degrees of freedom in heavy-ion collisions
[DE82-015751] N83-27820
Investigation of the potential functions of weakly bound diatomic molecules and laser-assisted excitive Penning ionization
[DE82-017259] N83-27833
Plasma laser accelerator: Longitudinal dynamics, the plasma/laser interaction, and a qualitative design
[DE82-014986] N83-27870
Discussions with Jens
[DE82-016622] N83-27896

CALIFORNIA UNIV., DAVIS.
User's manual for MODCAL: Bounding surface soil plasticity model calibration and prediction code, volume 2
[AD-A124867] N83-27523

CALIFORNIA UNIV., LIVERMORE.
Fundamental study of dense-fluid detonation
[AD-A125300] N83-27156

CALIFORNIA UNIV., LIVERMORE. LAWRENCE LIVERMORE LAB.
Nondestructive inspection and evaluation of composite-material flywheels
[DE82-015379] N83-26930
Potential of composite materials in surface transportation applications
[DE83-007218] N83-26931
Summary of ignition and growth modeling of shock initiation and delayed detonation in full-density and porous propellants
[DE83-007405] N83-27041
I. R. emission measurements of shocked rocket propellants by time-resolved infrared radiometry
[DE83-007356] N83-27042
Domed-grid-cathode project phases 1 and 2
[DE82-013844] N83-27136
Engineering Research Division publication report, calendar year 1981
[DE82-016086] N83-27265
Energy and technology review
[DE82-019880] N83-27390
Laboratory tests at elevated pressures of a silane igniter system for in-situ coal gasification
[DE83-007217] N83-27450
Ammonia-air fuel cell power plant systems analysis
[DE82-018914:] N83-27464
The DMSP/MFR total ozone and radiance data base
[NASA-CR-170370] N83-27531
Protocol translation and translators for heterogeneous computer networks
[DE83-007379] N83-27636
STOP: A fast method of disjointing binary product sets
[DE83-007483] N83-27670
Atomistic nonequilibrium computer simulations
[DE82-017551] N83-27831
Modeling beam-front dynamics at low gas pressures
[DE82-016636] N83-27842
Comparison of the initial ETA gas-propagation experiments with theoretical models
[DE82-015415] N83-27843

CALIFORNIA UNIV., RIVERSIDE.
High altitude jet fuel photochemistry
[AD-A125035] N83-27035

CALIFORNIA UNIV., SAN DIEGO.
Molecular dynamics of chemical reactions in solution
[AD-A124953] N83-26941

CALIFORNIA UNIV., SAN DIEGO, LA JOLLA.
Elongational viscosity rheological parameter study
[AD-A125265] N83-27261

CALIFORNIA UNIV., SANTA BARBARA.
Influence of temperature upon elastic limit and dislocation mobility of single-crystal HgI2
[DE82-017694] N83-27266

CALSPAN CORP., BUFFALO, N. Y.
Lateral flying qualities of highly augmented fighter aircraft, volume 1
[AD-A118070] N83-26835

CALSPAN FIELD SERVICES, INC., ARNOLD AIR FORCE STATION, TENN.
Integrated aerodynamic tests of the space shuttle vehicle during solid rocket booster separation at Mach 4.5 (IA193)
[AD-A125297] N83-26915

CANADA INST. FOR SCIENTIFIC AND TECHNICAL INFORMATION, OTTAWA (ONTARIO).
The analysis of residual stresses according to the Phi Psi Xi method with data compensation through ellipses
[NRC/CNR-TT-2061] N83-27257
Numerics of measuring residual stresses in near-surface layers by means of X-ray diffraction analysis. Part 1: Constant and inclined stress distribution
[NRC/CNR-TT-2060] N83-27258
Measurement of the thermodynamic quantities for the AG-S system by the EMF method
[NRC/CNR-TT-2062] N83-27892

CARNEGIE-MELLON UNIV., PITTSBURGH, PA.
Towards very large vocabulary word recognition
[AD-A125224] N83-27094
Two papers on circuit extraction
[AD-A125304] N83-27130
Quasernions in computer vision and robotics
[AD-A125876] N83-27600
Efficiency considerations for C programs on a VAX (trademark) 11/780
[AD-A125209] N83-27617
An empirical study of insertion and deletion in binary search trees
[AD-A125210] N83-27639
Problem solving techniques for the design of algorithms
[AD-A125211] N83-27643
Submodular set functions, amtroids and the greedy algorithm: Tight worst-cast bounds and some generalizations of the Rado-Edmonds theorem
[AD-A124981] N83-27671
Spelling correction in user interfaces
[AD-A125208] N83-27906

CARPENTER ENVIRONMENTAL ASSOCIATES, INC., NORTHVALE, N.J.
Explorator study of plasma arc jet shale conversion
[DE82-009090] N83-27388

CASE WESTERN RESERVE UNIV., CLEVELAND, OHIO.
Prediction of natural convection flow pattern in low-aspect ratio enclosures
[AD-A124995] N83-27161
Crack layer morphology and toughness characterization in steels
[NASA-CR-168154] N83-27256

CENTER FOR RENEWABLE RESOURCES, WASHINGTON, D.C.
Putting renewable energy to work in cities
[DE82-017237] N83-27472

CENTRAL ELECTRICITY GENERATING BOARD, SOUTHAMPTON (ENGLAND).
Creep deformation and crack growth in a low alloy steel welded pressure vessel containing defects N83-27225
The welding metallurgy of SA508 C1 II heat affected zones N83-27230

CENTRAL ELECTRICITY RESEARCH LABS., LEATHERHEAD (ENGLAND).
Creep rupture and creep crack growth behaviour of transition joints N83-27237
Damage accumulation and failure criteria in 'creep brittle' ferritic weldment structures N83-27238

CHALMERS UNIV. OF TECHNOLOGY, GOTEBORG (SWEDEN).
High quality transparent heat relfectors of reactively evaporated indium tin oxide N83-27363
The lumped mass finite element method for a parabolic problem
[CTH-MATH-1983-1] N83-27672
Extension of interpolation theorems for weighted Sobolev spaces
[CTH-MATH-1983-2] N83-27673
Finite element methods for linear hyberbolic problems
[CTH-MATH-1983-4] N83-27674
Periodic renewal theory
[CTH-MATH-1983-5] N83-27675
Existence and convergence of random set distributions
[CTH-MATH-1983-3] N83-27691

CHEM SYSTEMS, INC., FAIRFIELD, N.J.
Liquid-phase methanation/shift process development
[DE82-015214] N83-26961

CHICAGO UNIV., ILL.
Ion-channelling effects in scanning ion microscopy with a Ga+ probe N83-27709

CINCINNATI UNIV., OHIO.
Phase equilibria and transition in mixtures of a homopolymer and a block copolymer. 2: The phase diagram
[AD-A124929] N83-27025
Substructure of a 16-8-2 GTA weld as observed through TEM N83-27224

CITY OF EVANSTON, ILL.
Demonstration of an a-c utility connected wind generator in a urban setting
[DE83-006696] N83-27387

CITY OF TUCSON, ARIZ.
City of Tucson solar code
[DE82-016788] N83-27418

COASTAL ENGINEERING RESEARCH CENTER, FORT BELVOIR, VA.
Evaluation of physical and numerical hydraulic models, Masonboro Inlet, North Carolina
[AD-A116110] N83-27557
Prediction of nearshore wave transformation
[AD-A125104] N83-27561

COLORADO SCHOOL OF MINES, GOLDEN.
Performance of the CaF sub 2-CaO-SiO sub 2 system as a submerged arc welding flux for a niobium based HSLA steel N83-27231
The influence of flux composition on the chemistry and cleanliness of 2 1/4Cr-1Mo steel electroslag weld metal N83-27234

COLORADO STATE UNIV., FORT COLLINS.
How to solve materials and design problems in solar heating and cooling, Energy Technology Review No. 77
[DE83-006116] N83-27456
Experiments with phase transitions at very high pressure
[NASA-CR-3696] N83-27879

COMMITTEE ON APPROPRIATIONS (U. S. HOUSE).
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984 N83-27919
Department of Housing and Urban Development-Independent Agencies Appropriation Act, 1984: National Aeronautics and Space Administration N83-27920

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION (U. S. SENATE).
NASA authorization for fiscal year 1984
[GPO-19-200] N83-27921

COMPUTER CORP. OF AMERICA, CAMBRIDGE, MASS.
Program visualization
[AD-A125291] N83-27621

COMPUTER SCIENCES CORP., SILVER SPRING, MD.
The classification of LANDSAT data for the Orlando, Florida, urban fringe area
[E83-10327] N83-27311

CONSIGLIO NAZIONALE DELLE RICERCHE, FLORENCE (ITALY).
Use of the VHF signal of the Sirio satellite for ionospheric investigations N83-27533

CORNELL UNIV., ITHACA, N. Y.
Melt depth and regrowth kinetics in pulsed laser annealing of silicon and gallium arsenide
[DE83-005192] N83-27205
The feasibility of biogas production on farms
[DE83-007385] N83-27385

COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH, PRETORIA (SOUTH AFRICA).
DIF1: A dispersion program which can handle pollution and reflection
[ATMOS/82/11] N83-27478

CUMMINS ENGINE CO., INC., COLUMBUS, IND.
The Cummins advanced turbocompound diesel engine evaluation
[NASA-CR-168042] N83-27923

CURTISS-WRIGHT CORP., WOOD-RIDGE, N.J.
High-temperature turbine-technology program. Phase 2: Technology test and support studies. Design and development of a regeneratively fuel cooled high temperature gas turbine combustor for operation on low Btu gas
[DE83-007342] N83-27241
High-Temperature-Turbine-Technology Program. Phase 2: Technology test and support studies. Design and development of a high temperature low emissions combustor for stationary gas turbines
[DE83-005895] N83-27246

D

DALMINE S.P.A., MILAN (ITALY).
Creep characteristics of butt welded joints for thick 2 1/4Cr-1Mo pipework and pressure vessels N83-27233

DANISH METEOROLOGICAL INST., COPENHAGEN.
The ice conditions in the Greenland waters, 1975
[ISBN-87-7478-185-5] N83-27566

DARTMOUTH COLL., HANOVER, N.H.
Geology and mineral resources of the Boston 1 deg by 2 deg NTMS quadrangle, Massachusetts-New Hampshire N83-27329

DECISION FOCUS, INC., PALO ALTO, CALIF.
Integrated forecasting model, synthetic-fuels study. Volume 2: Model structure and input data
[DE82-905778] N83-27053

DEFENCE RESEARCH ESTABLISHMENT ATLANTIC, DARTMOUTH (NOVA SCOTIA).
Some simple formulae for normal mode wave numbers, cutoff frequencies and the number of modes trapped by a sound channel
[AD-A124948] N83-27798

DEFENCE RESEARCH ESTABLISHMENT SUFFIELD, RALSTON (ALBERTA).
A method for determining liquid volatility at ambient temperatures using an infrared gas analyzer
[AD-A124906] N83-26940

DEFENCE RESEARCH INFORMATION CENTRE, ORPINGTON (ENGLAND).
Relationship between structure and impact strength in as-solidified welds of mild and low alloy steels
[BLL-DRIC-T-6775-(3623.66)] N83-27251

DELAWARE UNIV., NEWARK.
Phase-change materials in masonry construction
[DE83-007227] N83-27061

DEPARTMENT OF ENERGY, BARTLESVILLE, OKLA.
Diesel fuel oils, 1982
[DE83-006115] N83-27051
Thermodynamics of organic compounds
[AD-A125022] N83-27895

DEPARTMENT OF ENERGY, DALLAS, TEX.
Libya, Algeria and Egypt: Crude oil potential from known deposits
[DE82-016578] N83-27334

DEPARTMENT OF ENERGY, PITTSBURGH, PA.
Proceedings of the Fourth International Symposium on Coal-Slurry Combustion, volume 3
[DE82-016351] N83-26982

Proceedings of the Fourth International Symposium on Coal-Slurry Combustion, volume 4
[DE82-016336] N83-26963

DEPARTMENT OF ENERGY, WASHINGTON, D. C.
Environmental safety and health requirements. Intermediate level skills training program
[DE82-013800] N83-27503
Summaries of the FY 1982 Applied Mathematical Sciences Research Program
[DE83-005815] N83-27668
Experimental plasma research project summaries
[DE83-007066] N83-27871

DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, COLOGNE (WEST GERMANY).
IEA small solar-power-system project, operation status
[DE82-020001] N83-27423

DRAPER (CHARLES STARK) LAB., INC., CAMBRIDGE, MASS.
Enabling technologies for large precision space systems N83-26881
Space flight experience with the Shuttle Orbiter control system N83-26900
A large antenna system flight experiment N83-26905

DU PONT DE NEMOURS (E. I.) AND CO., AIKEN, S.C.
Geology and mineral resources of the Baltimore, Boston, Lake Champlain, and Providence 1 deg by 2 deg NTMS quadrangles. National Uranium Resource Evaluation Program
[DE83-009825] N83-27327

DYNATECH R/D CO., CAMBRIDGE, MASS.
Development of a biochemical process for production of alcohol fuel from peat
[DE82-016692] N83-27039

E

EARTH SATELLITE CORP., CHEVY CHASE, MD.
Selecting band combinations with thematic mapper data
[E83-10303] N83-27294
Study of LANDSAT-D thematic mapper performance as applied to hydrocarbon exploration
[E83-10325] N83-27310

EARTHQUAKE ENGINEERING RESEARCH INST., BERKELEY, CALIF.
Prediction of the seismic responses of R/C frame-coupled wall structures
[PB83-149203] N83-27083
Joint opening nonlinear mechanism: Interface smeared crack model
[PB83-149195] N83-27084

ECOLE NATIONALE SUPERIEURE DES TELECOMMUNICATIONS, PARIS (FRANCE).
Decoding and synchronization of error correcting codes
[ENST-E-83001] N83-27113
Numerical treatment of Doppler radar signals
[ENST-E-82014] N83-27114
Design of active impedance microwave monolithic circuits with a GaAs substrate
[ENST-E-82012] N83-27143
The phase noise of semiconductor lasers in single mode optical fiber heterodyne systems
[ENST-E-82013] N83-27211
Unsteady models, vectorial autoregressive models, and Levinson's algorithm
[ENST-D-82005] N83-27676

ECON, INC., PRINCETON, N. J.
Status, trends and implications of carbon fiber material use
[PB83-147751] N83-26934

EDGERTON, GERMESHAUSEN AND GRIER, INC., IDAHO FALLS, IDAHO.
Operational readiness and the human factors environment
[DE83-005586] N83-27602
Figure-of-merit analysis and cost effectiveness of low-level radioactive waste treatment systems
[DE82-018890] N83-27838
Incinerator development program for processing transuranic waste at the Idaho National Engineering Laboratory
[DE82-017265] N83-27839
Preliminary calculations for testing a fission/fusion hybrid blandket module in a fission reactor: Addendum 2
[DE82-015622] N83-27860

EDGERTON, GERMESHAUSEN AND GRIER, INC., SANTA BARBARA, CALIF.
Place of HgI2 energy-dispersive X-ray detectors
[DE82-017651] N83-27193
Influence of temperature upon elastic limit and dislocation mobility of single-crystal HgI2
[DE82-017694] N83-27266

EDGERTON, GERMESHAUSEN AND GRIER, INC., WALTHAM, MASS.
Interpretation of the physical oceanography of Georges Bank, volume 1
[PB83-149054] N83-27568

EIC, INC., NEWTON, MASS.
Development of photoelectrochemical cells based on compound semiconductors and nonaqueous olectrolytes
[DE82-013700] N83-26968

EIDGENOESSISCHES INSTITUT FUER REAKTORFORSCHUNG, WUERENLINGEN (SWITZERLAND).
Concentrated solar-flux measurements at the IEA-SSPS solar-central-receiver power plant, Tabernas - Lameria (Spain)
[DE82-020000] N83-27528

ELOGIC, INC., HOUSTON, TEX.
Improved version of the split routine for CLASSY
[E83-10308] N83-27298
Assembly language coding for CLASSY
[E83-10309] N83-27299

EMC ENGINEERS, INC., DENVER, COLO.
Handbook of thermal insulation applications
[AD-A125264] N83-27158

ENERGY AND ENVIRONMENTAL RESEARCH CORP., IRVINE, CALIF.
Soot formation in synthetic-fuel droplets
[DE82-018420] N83-26958

ENERGY SYSTEMS GROUP, INC., ATLANTA, GA.
Analysis of field-test data from domestic solar-water heaters in the southern United States
[DE83-006822] N83-27455

ENGELHARD CORP., MENLO PARK, CALIF.
Develop and test fuel cell powered on-site integrated total energy system
[NASA-CR-168021] N83-27348

ENGELHARD INDUSTRIES, INC., EDISON, N.J.
Develop and test fuel cell powered on-site integrated total energy systems. Phase 3: Full-scale power plant development
[NASA-CR-168021] N83-27345

ENVIRONMENTAL RESEARCH INST. OF MICHIGAN, ANN ARBOR.
Study on spectral/radiometric characteristics of the thematic mapper for land use applications
[E83-10348] N83-27323
Research and development of LANDSAT-based crop inventory techniques
[E83-10359] N83-27325

EROS DATA CENTER, SIOUX FALLS, S. DAK.
LANDSAT 4 investigations of thematic mapper and multispectral scanner applications
[E83-10301] N83-27292

EUROPEAN SPACE AGENCY, NOORDWIKJ (NETHERLANDS).
Multimission advanced configuration N83-26890

EXIDE MANAGEMENT AND TECHNOLOGY CO., YARDLEY, PA.
Reseach, development, and demonstration of lead-acid batteries for electric vehicle propulsion
[DE82-016225] N83-27467

EXXON NUCLEAR IDAHO CO., INC., IDAHO FALLS.
Autoignition of kerosene/oxygen mixtures in a fluidized bed
[DE82-016376] N83-26952

F

FEDERAL AVIATION AGENCY, ATLANTIC CITY, N.J.
Digital flight control system validation
[AD-A124506] N83-26847

FEDERAL COMPILER TESTING CENTER, FALLS CHURCH, VA.
Micro Focus Ltd., INTEL MDS 231 (8080A), CIS COBOL V. 4.5 Rev 1 (COBOL technical report)
[PB83-155788] N83-27612
Micro Focus Ltd., INTEL series 2, level 2 COBOL V.2.2
[PB83-147603] N83-27632

FERMI NATIONAL ACCELERATOR LAB., BATAVIA, ILL.
The Livermore MTA Project and its influence on modern linacs N83-27725
Loss monitors for the Fermilab linac N83-27737
Recent work on collective accelerators N83-27771
The distributed control system for the Fermilab 200 MeV Linac N83-27782
Modulator reliability and bandwidth improvement: Replacing tetrodes with MOSFETs N83-27783
Remarks on future accelerators and future physics
[DE83-006643] N83-27822

FLIGHT DYNAMICS RESEARCH CORP., VAN NUYS, CALIF.
Mixing of compressible fluid with application to ejector thrusters N83-26803

FLORIDA STATE UNIV., TALLAHASSEE.
Polymers in mechanical systems: Structure-property requirements
[DE83-005590] N83-27029

FLORIDA UNIV., GAINESVILLE.
On Synge's criterion for the stability of plane Couette flow N83-26802
Concrete construction using slipform techniques
[AD-A124923] N83-27059
Acceptance control charts based on the exact and normal approximations to the binomial distributions
[AD-A124964] N83-27686
SAM: A semantic association model for corporate and scientific/statistical database
[DE83-006510] N83-27916
Index encoding: A compression technique for large statistical databases
[DE83-006431] N83-27917
Methodology for view integration in logical database design
[DE83-005754] N83-27918

FLUOROCHEM, INC., AZUSA, CALIF.
Research in energetic compounds
[AD-A124911] N83-27024

FLYING TRAINING WING (323D), MATHER AFB, CALIF.
AICUZ (Air Installation Compatible Use Zone) report
[AD-A124974] N83-27801

FONDAZIONE UGO BORDONI, ROME (ITALY).
Analysis of representative parameters grouping for the evaluation of voice signal automatic speaker recognition methods
[FUB-14-1982] N83-27115
Spectral analysis with an exponential window iterative method: The performance of the signal frequency evaluation
[FUB-15-1982] N83-27116
Frequency charts using an iterative signal processing method
[FUB-16-1982] N83-27117
DPSNA-1: A simulation model for queueing networks with limited capacity and repetition of service demand calls
[FUB-19-1982] N83-27118
Automatic generation of adequate graphs with given connectivity conditions
[FUB-20-1982] N83-27119
The statistical properties of autosynchronizing scramblers
[FUB-21-1982] N83-27120
Design of an additive scrambler for parallel connection with numerical multiplexers at 565 Mb/sec
[FUB-22-1982] N83-27121
Statistical properties of the sequences produced by additive scramblers
[FUB-23-1982] N83-27122
Speech intelligibility in closed large scale environments
[FUB-24-1982] N83-27123
Test networks defined by an average rank and a planarity index
[FUB-31-1982] N83-27124
A flow control scheme considering retransmissions in packet switched datagram transport networks
[FUB-32-1982] N83-27125

FORD, BACON AND DAVIS UTAH, INC., SALT LAKE CITY.
Low-level radioactive waste disposal. Study of a conceptual nuclear energy center at Green River, Utah
[DE83-006835] N83-27844

FRAUNHOFER-INST. FUER ATMOSPHAERISCHE UMWELTFORSCHUNG, GARMISCH-PARTENKIRCHEN (WEST GERMANY).
Atmospheric conditions influencing slant path low visibility
[AD-A116109] N83-27847

FUKUI UNIV. (JAPAN).
A program development for SUPERFISH N83-27768

G

GENERAL ACCOUNTING OFFICE, WASHINGTON, D. C.
Small computers in the federal government: Management is needed to realize potential and prevent problems
[GAO/AFMD-83-36] N83-27604

GENERAL APPLIED SCIENCE LABS., INC., WESTBURY, N. Y.
Testing of felt-ceramic materials for combustor applications
[NASA-CR-168103] N83-26837

GENERAL ATOMIC CO., SAN DIEGO, CALIF.
Dissimilar weld failure analysis and development program N83-27239

GENERAL DYNAMICS/CONVAIR, SAN DIEGO, CALIF.
Status of deployable geo-truss development N83-26875
GENERAL ELECTRIC CO., CLEVELAND, OHIO.
Conducted and radiated signatures of fluorescent lamp systems in C and I environments N83-27108
GENERAL ELECTRIC CO., PHILADELPHIA, PA.
Land mobile satellite system requirements N83-26855
LANDSAT-D data format control book. Volume 6, appendix C: Partially processed multispectral scanner high density tape (HDT-AM)
[E83-10274] N83-27286
LANDSAT-D flight segment operations manual, volume 1
[E83-10285] N83-27287
LANDSAT-D flight segment operations manual, volume 2
[E83-10286] N83-27288
LANDSAT-D flight segment operations manual. Appendix A: Coefficients/calibration data
[E83-10287] N83-27289
LANDSAT-D flight segment operations manual. Appendix B: OBC software operations
[E83-10288] N83-27290
Design and development of a high-concentration photovoltaic concentration (2-d)
[DE82-008924] N83-27433
GENERAL ELECTRIC CO., SCHENECTADY, N. Y.
Catalytic CO2 gasification of graphite vs. coal char
[DE82-016412] N83-26959
Coal-gasification catalysis mechanisms
[DE82-013824] N83-26960
H2S removal from coal gas at mid temperature (150 to 200 deg C)
[DE82-011004] N83-26963
Reduction of AM radio interference through control of radiated electric field N83-27106
GENERAL ELECTRIC CO., ST. PETERSBURG, FLA.
Anode phenomena in vacuum arcs
[DE83-007181] N83-27141
Interfacing a torsion pendulum with a microcomputer
[DE83-004032] N83-27792
GENERAL OCEANICS, INC., MIAMI, FLA.
Blake Plateau: Mid-depth and bottom current measurements
[PB83-144519] N83-27567
GEORGIA INST. OF TECH., ATLANTA.
NASA interdisciplinary collaboration in tribology. A review of oxidational wear
[NASA-CR-3686] N83-27021
Organic solvent regeneration of granular activated carbon
[PB83-150201] N83-27078
Stability of laminated composite shells subjected to uniform axial compression and torsion
[AD-A125204] N83-27262
Matching based interactive facility layout
[AD-A124958] N83-27609
Project scheduling with resource considerations
[AD-A124938] N83-27901
GEORGIA UNIV., ATHENS.
Geometric accuracy of LANDSAT-4 MSS image data
[E83-10347] N83-27322
GESELLSCHAFT FUER KERNENERGIEVERWERTUNG IN SCHIFFBAU UND SCHIFFAHRT M.B.H., GEESTHACHT (WEST GERMANY).
Fatigue crack growth from blunt notches
[GKSS-82/E/44] N83-27276
GESELLSCHAFT FUER SCHWERIONENFORSCHUNG M.B.H., DARMSTADT (WEST GERMANY).
Status report on operation and upgrading of the Unilac N83-27727
GRUMMAN AEROSPACE CORP., BETHPAGE, N.Y.
Reduced order control design for large space structures: A communication satellite example N83-26882
A robot in space as a large space structures control experiment N83-26899

H

HAHN-JACKSON-THRESHER-HENNING, INC., EVANSVILLE, IND.
Solar-assisted water-source heat pump
[DE83-006023] N83-27457
HAHN-MEITNER-INSTITUT FUER KERNFORSCHUNG, BERLIN (WEST GERMANY).
Anomalies in the thickness dependence of the energy loss of helium and nitrogen ions in very thin carbon foils N83-27710
HANFORD ENGINEERING DEVELOPMENT LAB., RICHLAND, WASH.
Use of microhardness to determine the strengthening and microstructural alterations of 14-MeV-neutron-irradiated metals
[DE82-014002] N83-27000
HARRIS CORP., MELBOURNE, FLA.
Hoop/column antenna development program N83-26874
The effects of mesh reflecting surfaces upon radiometric measurements N83-26894
Phased array-fed antenna configuration study
[NASA-CR-168077] N83-27086
HARRY DIAMOND LABS., ADELPHI, MD.
Effect of frequency-dependent soil parameters on reflection coefficients
[AD-A124798] N83-27091
HARVARD UNIV., CAMBRIDGE, MASS.
Components of mental imagery representation
[AD-A124616] N83-27591
HAWAII UNIV., HONOLULU.
Kahuku kite wind study. 1: Kahuku beach boundary layer
[DE83-006403] N83-27553
Kahuku kite wind study. 2: Kahuku foothills
[DE83-006402] N83-27554
HOCHSCHULE DER BUNDESWEHR, NEUBIBERG (WEST GERMANY).
Approximation methods for the distribution of random sums N83-27692
HOEGSKOLAN I LULEAA (SWEDEN).
Dynamics of three-dimensional disturbances in water table flow
[TULEA-1982-36-T] N83-27175
Observations of turbulent spots on a water table
[TULEA-1982-039-T] N83-27176
Stability of an impact-loaded elastic column with two degrees of freedom
[TULEA-1981-05-T] N83-27270
Influence of damping on the transverse displacement of an impact-loaded column with two degrees of freedom
[TULEA-1981-06-T] N83-27271
Experimental investigation of a mechanical impedance gauge based on measurement of strains on a conical rod
[TULEA-1981-66-T] N83-27272
Composite beams from a statistical point of view
[TULEA-1982-05-T] N83-27273
HOUSTON LIGHTING AND POWER CO., TEX.
Utility geothermal plans, Texas and Louisiana N83-27373
HOUSTON UNIV., TEX.
The possible modifications of the HISSE model for pure LANDSAT agricultural data
[E83-10305] N83-27295
Analysis, design, fabrication, and testing of moderately concentrating solar-energy collectors
[DE83-006065] N83-27445
HUGHES AIRCRAFT CO., EL SEGUNDO, CALIF.
INTELSAT 6 antenna system design and development N83-26888
HUGHES RESEARCH LABS., MALIBU, CALIF.
Nuclear magnetic resonance gyroscope
[AD-A124925] N83-27185
HUNTER COLL., NEW YORK.
Monitoring tropical vegetation succession with LANDSAT data
[E83-10306] N83-27296
HUNTINGTON ALLOYS, INC., W. VA.
Some observations on the physical metallurgy of nickel alloy weld metals N83-27240
HYDRO-ELECTRIC POWER COMMISSION, TORONTO (ONTARIO).
Welding practices in fossil-fired units N83-27219
HYDRO-QUEBEC INST. FOR RESEARCH, VARENNES.
Weld penetration variation in GTA welding of some 304 L stainless steels N83-27222

I

ILLINOIS UNIV., CHICAGO.
Development of procedures and algorithms for pattern recognition and image processing based on two-dimensional Markov models
[AD-A124917] N83-27682
ILLINOIS UNIV., URBANA.
Hydrogen transport in and through niobium
[DE82-017214] N83-26980
S-C-R compatibility and dual task performance in two complex information processing tasks: Threat evaluation and fault diagnosis
[AD-A124340] N83-27589
Low-temperature ultrasonic attenuation in rapidly cooled niobium containing oxygen and hydrogen
[DE82-012717] N83-27806
Current interruption and particle beam generation by a plasma focus
[AD-A125024] N83-27858
Elastic constants of plastic crystals by Schaefer-Bergmann scattering: Crystalline cyclohexane and deuteromethane
[DE82-018660] N83-27885
Preparation and characterization of glassy and crystalline mixed chalcopyrite semiconducting compounds
[DE83-005352] N83-27889
IMPERIAL COLL. OF SCIENCE AND TECHNOLOGY, LONDON (ENGLAND).
Representations of combustion in computer models of spark ignition
[CFD/82/18] N83-26986
Turbulence models; a lecture course
[CFD/82/4-REV] N83-27180
Application of a new version of the k-W model of turbulence to equilibrium boundary layer flow over a flat plate with: (1) intense heat transfer and (2) streamwise adverse pressure gradients
[CFD/82/14] N83-27181
Application of a new version of the k-W model of turbulence to a boundary layer with mass transfer
[CFD/82/15] N83-27182
INDIAN INST. OF SCIENCE, BANGALORE.
On the large scale structure of turbulence in boundary layer and shear flows N83-26800
INSTITUT GEOGRAPHIQUE NATIONAL, PARIS (FRANCE).
Mapping from space and the SPOT project N83-27477
INSTITUT NATIONAL DE LA RECHERCHE AGRONOMIQUE, AVIGNON (FRANCE).
Yield forecasting from remote sensing data: A survey of methods available in 1982
[REPT-M/83/5] N83-27343
INSTITUTE FOR DEFENSE ANALYSES, ARLINGTON, VA.
A note on the oscillation of cavities coupled to aerodynamic flows N83-26795
INSTITUTE FOR THEORETICAL AND EXPERIMENTAL PHYSICS, MOSCOW (USSR).
The pulsed proton prototype of a high current ion linac N83-27747
The 1981 Linear Accelerator Conference on Proton Beam Emittance Growth in Linac N83-27755
INSTITUTE OF GAS TECHNOLOGY, CHICAGO, ILL.
Development of a pressurized fluidized-bed biomass gsifier to produce substitute fuels
[DE82-013265] N83-27401
Hydropyrolysis of biomass and related materials for the production of liquids
[DE82-012928] N83-27402
Effect of confining pressure on pore volume in tight sandstones
[DE82-013573] N83-27524
Calculation of calorific value of coal/char from its ultimate analysis
[DE82-012879] N83-27899
INSTITUTO DE PESQUISAS ESPACIAIS, SAO JOSE DOS CAMPOS (BRAZIL).
Concepts for a Standard Data Interchange Structure (SDIS) INPE proposal to CCSDS/Panel 3
[INPE-2724-PRE/308] N83-27087
Concepts for connectivity and interoperability of world space data networks: INPE proposal to CCSDS/Panel 3
[INPE-2722-PRE/307] N83-27088
Dissemination of digital satellite imagery through telephone lines
[INPE-2725-PRE/309] N83-27089
Mapping of land use and geomorphology in the APAPORE project area by LANDSAT satellite data, volume 2
[E83-10333] N83-27281
Mapping of land use and geomorphology in the APAPORE project area by LANDSAT satellite data, volume 3
[E83-10334] N83-27282
Evaluation of ground cover and land use in the PDRI-AM remote sensing technique program area
[E83-10230] N83-27283
Mapping of land use and geomorphology in the APAPORE project area by LANDSAT satellite data, volume 1
[E83-10332] N83-27314
Remote Sensing techniques used to characterize soil erosion in southwestern Sao Paulo state
[E83-10339] N83-27315
Geologic mapping of the Bauru Group in Sao Paulo state by LANDSAT images
[E83-10341] N83-27316

Effect of scene illumination conditions on digital enhancement techniques of multispectral scanner LANDSAT images
[E83-10344] N83-27319

The Ponta Grossa Arch: A proposal for ts configuration and evolution from the interpretation of remote sensing data
[E83-10343] N83-27320

Equatorial electrojet movements at Huancayo and Eusebio (Fortaleza) on selected quiet days
[INPE-2740-PRE/319] N83-27521

Contrasts between wet and dry periods within the 1981 rainy season in northeast Brazil
[INPE-2728-PRE/310] N83-27539

Low latitude upper tropospheric cyclonic vortices in the South Atlantic: Their origin, characteristics and effects on tropical convection over eastern Brazil
[INPE-2729-PRE/311] N83-27540

Synoptic precursors of three severe Brazilian freezes in the Pacific Ocean and South America
[INPE-2730-PRE/312] N83-27541

A local single particle self energy for the Hubbard model
[INPE-2736-PRE/316] N83-27810

Deep impurities: A crystalline cluster approach
[INPE-2717-PRE/303] N83-27878

Persistent 1.5s oscillations superimposed at a solar burst observed at two mm-wavelengths
[INPE-2737-PRE/317] N83-27948

INTERNATIONAL BUSINESS MACHINES CORP., YORKTOWN HEIGHTS, N. Y.

Empirical stopping powers for ions in solids
N83-27706

J

JAPAN ATOMIC ENERGY RESEARCH INST., TOKYO.

Stopping power of rare gases in amorphous silicon for MeV helium ions N83-27707

JET PROPULSION LAB., CALIFORNIA INST. OF TECH., PASADENA.

Large spaceborne antenna technology: A system perspective N83-26854

Large deployable reflector: An infrared and submillimeter orbiting observatory N83-26858

Survey of deployable antenna concepts N83-26872

Control of large space antennas N83-26880

Shape determination/identification for large space antennas N83-26885

Large space antenna communications systems: Integrated Langley Research Center/Jet Propulsion Laboratory development activities. 3: Jet Propulsion Laboratory activities N83-26893

Autonomous spacecraft design and validation methodology handbook
[NASA-CR-172678] N83-26920

Technology needs for Air Force autonomous spacecraft
[NASA-CR-172677] N83-26921

Waveguide cooling system
[NASA-CASE-NPO-15401-1] N83-27085

Particle analyzing method and apparatus
[NASA-CASE-NPO-15292-1] N83-27184

Numerical dynamic analysis of structures by the finite dynamic element method
[AD-A125213] N83-27642

JOHANN-WOLFGANG-GOETHE-UNIVERSITAT, FRANKFURT AM MAIN (WEST GERMANY).

A FRQ concept using circular rods N83-27744

Properties of a 0-mode RFQ structure and recent experimental results N83-27748

JOHNS HOPKINS UNIV., BALTIMORE, MD.

Geology and mineral resources of the Baltimore 1 deg by 2 deg NTMS quadrangle, Maryland-Pennsylvania-Virginia N83-27328

JOINT CENTER FOR GRADUATE STUDY, RICHLAND, WASH.

Silicon MIS/inversion-layer solar cells
[DE83-005422] N83-27453

JOINT PUBLICATIONS RESEARCH SERVICE, ARLINGTON, VA.

USSR report: Life sciences. Effects of nonionizing electromagnetic radiation, no. 9
[JPRS-83601] N83-27572

Effect of decimeter waves on functional state of cardiovascular system, some biochemical and immunological parameters of patients recovering from myocardial infarction N83-27573

Morphological effects of chronic action of SHF field on nervous system of mice N83-27574

Investigation of adaptive processes in peripheral blood using mathematical modeling methods N83-27575

Function of adreno-pituitary system in various regimes of effect of alternating magnetic field of industrial frequency N83-27576

K

KANSAS STATE UNIV., MANHATTAN.

Assessing solar energy and water use efficiencies in winter wheat
[E83-10329] N83-27313

KANSAS UNIV., LAWRENCE.

Assessment of the geothermal resources of Kansas
[DE83-003210] N83-27338

KARLSRUHE UNIV. (WEST GERMANY).

Experimental investigation of jets in a cross flow
[KU-SFB-80/E/219] N83-27177

Calculation of turbulence-driven secondary motion in noncircular ducts
[KU-SFB-80/T/220] N83-27178

Funneling of heavy ion beams N83-27759

KAWASAKI STEEL CORP., CHIBA (JAPAN).

Toughness of submerged arc weld metals of controlled rolled Nb bearing steel N83-27232

KENT STATE UNIV., OHIO.

Effects of autocorrelation upon LANDSAT classification accuracy
[E83-10328] N83-27312

KENTUCKY UNIV., LEXINGTON.

Apparatus for determining changes in limb volume
[NASA-CASE-MSC-18759-1] N83-27578

Response of the cardiovascular system to vibration and combined stresses
[AD-A125225] N83-27583

KERNFORSCHUNGSZENTRUM, KARLSRUHE (WEST GERMANY).

Dead beat filling and feedforward RF control for the spallation neutron source SNQ N83-27733

Preaccelerator design and component development for the SNQ linear accelerator N83-27734

On space charge instabilities and emittance growth in RF linacs N83-27752

Statistical treatment of misalignments in linear accelerators N83-27757

MOTION: A versatile multiparticle simulation code N83-27758

Funneling of heavy ion beams N83-27759

KIRUNA GEOPHYSICAL INST. (SWEDEN).

Ray tracing in dissipative media
[KGI-PREPRINT-060] N83-27112

KMS FUSION, INC., ANN ARBOR, MICH.

Brillouin backscatter from gas-jet targets illuminated by a multi-line laser source
[DE82-012586] N83-27206

KYOTO UNIV. (JAPAN).

Medium dependence of charge state fractions of MeV He beam N83-27718

Charge state distribution of light ions at glancing collision N83-27719

L

LABORATORY OF THE GOVERNMENT CHEMIST, LONDON (ENGLAND).

A novel general purpose computer correction procedure for quantitative X-ray fluorescence analysis
[LGC-1/1982] N83-26987

LEHIGH UNIV., BETHLEHEM, PA.

Nonlinear response arising from non self-similar crack growth in finite thickness plates
[DE83-005946] N83-27267

Fluxoid pinning by grain boundaries in bicrystals and polycrystals of niobium
[DE82-017406] N83-27891

LEVY (SALOMON), INC., CAMPBELL, CALIF.

Critical flow data review and analysis
[DE82-902199] N83-27172

LEYBOLD-HERAEUS G.M.B.H., HANAU/MAIN (WEST GERMANY).

Low emissivity and solar control coatings on architectural glass N83-27359

Performance and sputtering criteria of modern architectural glass coatings N83-27366

Vacuum roll coating equipment N83-27369

LIGHTNING TECHNOLOGIES, INC., PITTSFIELD, MASS.

Aircraft lightning-induced voltage test technique developments
[NASA-CR-170403] N83-26829

LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.

Isolation transformers for utility-interactive photovoltaic systems
[DE83-006914] N83-27140

Data report for the Northeast Residential Experiment Station, March 1982
[DE82-018134] N83-27397

Data report for the Southwest Residential Experiment Station, February 1982
[DE82-016330] N83-27398

LOS ALAMOS SCIENTIFIC LAB., N. MEX.

Residential photovoltaic system simulation: Thermal aspects
[DE82-007784] N83-27399

Final materials, processes, and testing progress report for residential and non-residential applications
[DE82-017285] N83-27427

Natural Bridges National Monument photovoltaic power plant operations manual
[DE82-015388] N83-27438

LITTLE (ARTHUR D.), INC., CAMBRIDGE, MASS.

Responses of airborne biota to microwave transmission from satellite power system
[DE83-006495] N83-27498

LOCKHEED ENGINEERING AND MANAGEMENT SERVICES CO., INC., HOUSTON, TEX.

A nonparametric clustering technique which estimates the number of clusters
[E83-10310] N83-27300

Composition and assembly of a spectral and agronomic data base for 1980 spring small grain segments
[E83-10311] N83-27301

METCOR4: A program to simulate METSAT data
[E83-10313] N83-27302

Atmospheric effects on METSAT data
[E83-10314] N83-27303

Technical summary of accomplishments made in preparation for the USSR barley exploratory experiment
[E83-10315] N83-27304

Australia ground data collection 1981-82 crop year, appendixes A and B, volume 2
[E83-10316] N83-27305

Australia ground data collection 1981-82 crop year, volume 1
[E83-10317] N83-27306

LOCKHEED-GEORGIA CO., MARIETTA.

Experimental studies of the separating confluent boundary-layer. Volume 1: Summary
[NASA-CR-3655] N83-26822

LOCKHEED MISSILES AND SPACE CO., PALO ALTO, CALIF.

Computer analysis and ground testing of large space systems control strategies N83-26884

LOCKHEED MISSILES AND SPACE CO., SUNNYVALE, CALIF.

Spacecraft material applications: Long-term stability questions N83-26867

Wrap-rib antenna concept development overview N83-26873

A procedure for combining acoustically induced and mechanically induced loads (first passage failure design criterion)
[NASA-CR-166824] N83-27795

LOS ALAMOS SCIENTIFIC LAB., N. MEX.

Verification studies of entrained-flow gasification and combustion systems with the SIMMER-II code
[DE82-012148] N83-26978

Molecular-orbital calculations for polynitropolyhedranes
[DE82-018390] N83-27023

Oblique interactions of detonation waves with explosive/metal interfaces
[DE83-007119] N83-27038

Thermochemistry of mixed explosives
[DE82-012149] N83-27045

Thermochemical processes for solar hydrogen production
[DE82-019575] N83-27047

Jet penetration of inerts and explosives
[DE83-003746] N83-27052

Design and development of a titanium heat-pipe space radiator
[DE82-013749] N83-27166

Statistical Techniques Applied to Aerial Radiometric Surveys (STAARS): Application of the Huber M-estimator to aerial radiometric data for the identification of host and source areas for uranium deposits
[DE82-018199] N83-27335

Economic analysis of the integrated heating and cooling potential of a residential passive-solar water wall design
[DE82-018372] N83-27419

Validation of passive-solar analysis/design tools using class A performance-evaluation data
[DE82-017588] N83-27420

Assessment of water use impacts from solar-energy development
[DE83-004888] N83-27448

Quality assurance for environmental analytical chemistry: 1981
[DE83-007102] N83-27513

Candidate sites for future hot-dry-rock development in the United States
[DE83-007103] N83-27525

Evaluation and performance of closed-circuit breathing apparatus
[DE82-015877] N83-27601

Bringing a large computer network into FOCUS
[DE82-010412] N83-27635
Mapping method for generating three-dimensional meshes: Past and present
[DE82-014077] N83-27664
Degenerate perturbation theory
[DE82-019555] N83-27665
Predicting low-probability/high-consequence events
[DE82-018373] N83-27668
Proceedings of the 1981 Linear Accelerator Conference
[DE82-013754] N83-27724
Octupole focusing in transport and acceleration systems N83-27731
Matching the RF quadrupole beam to the drift tube section in the FMIT accelerator N83-27732
Tuning experience with the FMIT scale-model drift-tube linac N83-27741
Cavity loading associated with high-current RF linacs N83-27754
Evolution of the racetrack microtron control system N83-27760
Variable-energy drift-tube linacs N83-27764
Proceedings of the Los Alamos Neutrino Workshop
[DE83-000427] N83-27812
LAMPF transition region
[DE82-019489] N83-27824
The Gamow-Teller strength functions and neutrino problems
[DE82-018357] N83-27826
Muon spin-rotation study on magnetite
[DE82-019535] N83-27834
Nuclear reactor system study for NASA/JPL
[NASA-CR-172631] N83-27836
Space reactors
[DE82-019187] N83-27837
LAMPF: Proposal status and summaries
[DE82-015887] N83-27841
Overview of pulsers for nanosecond gating of image-shutter tubes
[DE82-019533] N83-27850
Recent results on the dense Z-pinch
[DE82-015802] N83-27859
High-power-density approaches to magnetic fusion energy: Problems and promise of compact Reversed-Field Pinch Reactors (CRFPR)
[DE82-015736] N83-27861
Stability and confinement of spheromaks and field-reversed configurations
[DE82-018378] N83-27862
Compact toroid experiments: Spheromaks and field-reversed configurations
[DE82-015882] N83-27865
Bump masses for BL Her stars
[DE83-019564] N83-27943

LOUGHBOROUGH UNIV. OF TECHNOLOGY (ENGLAND).
Heat mirrors on plastic sheet using transparent oxide conducting coatings N83-27364
New techniques for roll coating of optical thin film N83-27371

LOUISIANA STATE UNIV., BATON ROUGE.
Technical support for geopressured-geothermal-well activities in Louisiana
[DE83-005297] N83-27473

LULEA UNIV. (SWEDEN).
Fiber reinforced composite materials
[TULEA-1981-02] N83-26933
Powder forging of compound steels, part 1
[TULEA-1982-16-PT-1] N83-27012
Powder forging of compound steels, part 2
[TULEA-1982-17-PT-2] N83-27013
A turbulence model for depth-averaged equations of motion
[TULEA-1981-07] N83-27174
A method for testing components in the high acceleration frequency range
[TULEA-1981-18] N83-27269
Determination of mechanical impedance through strain measurement on an impacted slender rod
[TULEA-1982-33-T] N83-27274
On the numerical prediction of vertical turbulent exchange in stratified flows
[TULEA-1981-08] N83-27340
State space models of the Nash cascade: Kinematic and diffusion waves
[TULEA-1981-14] N83-27341
On the discretization of the continuous Nash-cascade
[TULEA-1981-17] N83-27342
A mathematical model of the urban boundary layer
[TULEA-1982-09] N83-27515
Modeling the turbulence structure of the adiabatic atmospheric boundary layer
[TULEA-1982-12] N83-27532
The VDU operators' preferred environmental conditions in a telephone information center
[TULEA-1982-11] N83-27603

LUNAR SCIENCE INST., HOUSTON, TEX.
Conference on Planetary Volatiles
[NASA-CR-172682] N83-27938

LUND UNIV. (SWEDEN).
Monitoring land degradation in southern Tunisia: A test of LANDSAT imagery and digital data
[E83-10320] N83-27308

M

MAINZ UNIV. (WEST GERMANY).
Operating experience with MAMI 1 N83-27729
Beam instabilities in race track microtrons N83-27773
Automatic beam-steering of the Mainz Microtron N83-27775
The design of double sided microtrons N83-27778
A modular system for the control of complex acceleratos using portable software N83-27781

MARATHON OIL CO., BRIDGEPORT, ILL.
Commercial scale demonstration: Enhanced oil recovery by micellar-polymer flood
[DE82-013574] N83-27333

MARTIN MARIETTA AEROSPACE, DENVER, COLO.
Definition of technology development missions for early space station satellite servicing, volume 1
[NASA-CR-170786] N83-26850
Definition of technology development missions for early space station satellite servicing, volume 2
[NASA-CR-170787] N83-26851
Earth observation system: Spacecraft design N83-26861
A 15-meter deployable aperture microwave radiometer N83-26862
Box truss development and applications N83-26876

MARYLAND UNIV., COLLEGE PARK.
Computational fluid dynamics: An engineering tool? N83-26796
Using pyramids to detect good continuation
[AD-A124848] N83-27616
Motion estimation based on multiple local constraints and nonlinear smoothing
[AD-A124836] N83-27640
The post-processing approach in the finite element method. Part 1: Calculation of displacements, stresses, and other higher derivatives of the displacements
[AD-A125039] N83-27660
The post-processing approach in the finite element method. Part 2: The calculation of stress intensity factors
[AD-A125040] N83-27661
ULTRAFISH: Generalization of SUPERFISH to m equal to or less than 1 N83-27749
Design of REC permanent magnet quadrupoles taking into account B, H non-linearity N83-27770
Experimental studies of electron beam focusing with solenoid lenses near the space charge limit N83-27772
Contour-based motion estimation
[AD-A124812] N83-27848
Determining velocities by propagation
[AD-A124889] N83-27849

MASON AND HANGER-SILAS MASON CO., INC., AMARILLO, TEX.
Quantitative analysis of TATB impurities by thin layer chromatography
[DE83-007094] N83-26977
Corner-turning characteristics of TATB/HMX/Kel-F mixtures
[DE83-006931] N83-27037

MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
Manned assembly of space structures N83-26869
Electrostatically figured membrane reflectors: An overview N83-26870
Dynamic powder compaction of rapidly solidified Path A alloy with increased carbon and titanium content
[DE82-017252] N83-27008
Welding technologies and materials for energy applications in Japan N83-27218
Improvement of fusion welding through modelling, measurement and real-time control N83-27226
Flywheel energy-storage-and-conversion system for photovoltaic applications
[DE82-017128] N83-27437
Optimal smoothing and estimation for hybrid state processes
[AD-A124907] N83-27683
Optimal decentralized control of finite nondeterministic systems
[AD-A124940] N83-27684
Sufficient statistics for decentralized estimation
[AD-A124941] N83-27689
Thermal analysis of the vertical bridgman semiconductor crystal growth technique
[NASA-CR-172627] N83-27875
Query optimization in distributed databases
[AD-A124921] N83-27909

MASSACHUSETTS INST. OF TECH., OAK RIDGE, TENN.
Ion-exchange behavior of alkali metals on treated carbons
[DE83-005980] N83-27835

MAX-PLANCK-INSTITUT FUER PLASMAPHYSIK, GARCHING (WEST GERMANY).
Computer simulation of longitudinal-transverse space charge effects in bunched beams N83-27751

MAX-PLANCK-INSTITUT FUER STROEMUNGSFORSCHUNG, GOETTINGEN (WEST GERMANY).
The FO2 radical and Laser Magnetic Resonance (LMR) spectra in reactions of fluorine atoms
[MPIS-19/1982] N83-26985
Investigation of the dynamics of electronically excited states after excitation with an excimer laser
[MPIS-14/1982] N83-27209

MAXWELL LABS., INC., SAN DIEGO, CALIF.
High frequency, high power capacitor development
[NASA-CR-166035] N83-27127

MCDONNELL-DOUGLAS CORP., ST. LOUIS, MO.
Aircraft aerodynamic prediction method for V/STOL transition including flow separation
[NASA-CR-166467] N83-26819

MCDONNELL-DOUGLAS RESEARCH LABS., ST. LOUIS, MO.
Dynamic response of ramjet inlets to downstream perturbations
[AD-A125295] N83-27157

MECHANICAL TECHNOLOGY, INC., LATHAM, N. Y.
Automotive Stirling Engine Development Program
[NASA-CR-168074] N83-27925

MERIDIAN CORP., FALLS CHURCH, VA.
Biomass-energy-technology program summary
[DE82-018926] N83-27426

MERRICK ENGINEERING, INC., NASHVILLE, TENN.
Robotics in welding N83-27227

MICHIGAN TECHNOLOGICAL UNIV., HOUGHTON.
Properties of three-dimensional energetic solids and molecular crystals
[AD-A124944] N83-27880

MICHIGAN UNIV., ANN ARBOR.
Experiments on focusing systems in laser initiated discharge channels
[AD-A125296] N83-27207

MIDWEST RESEARCH INST., GOLDEN, COLO.
Fundamental pyrolysis studies
[DE82-009808] N83-26969
Dissociated methanol test results
[DE82-013565] N83-27054
Frequency-domain approach to passive building energy analysis
[DE82-019164] N83-27063
Flash evaporation from turbulent water jets
[DE83-007311] N83-27168
Conceptual design of the Truscott Brine Lake solar pond system. Volume 2: Utility-integrated scenario
[DE83-008133] N83-27386
Low-cost, sprayed CdTe solar-cell research
[DE83-007275] N83-27392
Computer-aided analysis of energy consumption in ethanol-water distillation operations
[DE82-014333] N83-27413
Engineering analysis of potential photosynthetic bacterial hydrogen-production systems
[DE82-019151] N83-27414
Development and application of fully-automated EBIC techniques for solar-cell measurements
[DE82-014409] N83-27415
Renewable energy technology handbook for military engineers
[DE82-017689] N83-27431
Research results for the tornado wind-energy system: Analysis and conclusions
[DE83-006091] N83-27443
Beer's-law-based, simple spectral model for direct normal and diffuse horizontal irradiance
[DE83-008132] N83-27526

MILLER AND MILLER, INC., ORLANDO, FLA.
Large-scale operations management test of use of the White Amur for control of problem aquatic plants. Part 4. Third year poststocking results. Volume 6. The water and sediment quality of Lake Conway, Florida
[AD-A124443] N83-27479

MINNESOTA UNIV., MINNEAPOLIS.
Variational transition-state theory
[DE83-006003] N83-26973
Anomalies in parallel branch-and-bound algorithms
[AD-A125290] N83-27648

MISSION RESEARCH CORP., ALBUQUERQUE, N. MEX.
The image displacement instability in radial line accelerators N83-27777
MISSOURI UNIV., ROLLA.
Research support for plasma diagnostic on Elmo Bumpy Torus. Observations of EBT ring geometry by means of diamagnetic field measurements using a compensated ferromagnetic resonance magnetometer, and a preliminary numerical study of EBT flux penetration dynamics
[DE83-007883] N83-27864
MITRE CORP., MCLEAN, VA.
Further studies on developing technology for indirect liquefaction
[DE82-017677] N83-27406
Status of the DOE battery and electrochemical technology program, 3
[DE82-018912] N83-27469
MITSUBISHI HEAVY-INDUSTRIES LTD., NAGASAKI (JAPAN).
Small geothermal power plant. Portable turbine generator N83-27380
MONTANA UNIV., MISSOULA.
Current stopping power analyses N83-27701
MORGANTOWN TECHNOLOGY CENTER, W. VA.
Deep-source-gas workshop technical proceedings
[DE83-005003] N83-27339
MOUND LAB., MIAMISBURG, OHIO.
Laser marking of component parts
[DE83-006728] N83-27208
Gamma-ray for simultaneous calorimetric assay
[DE82-008615] N83-27826
MUELLER ASSOCIATES, INC., BALTIMORE, MD.
Status of alcohol fuels utilization technology for highway transportation: A 1981 perspective. Volume 2: Compression-ignition engines
[DE83-008127] N83-27036

N

NAGOYA UNIV. (JAPAN).
Experimental studies on energy transport in a reversed field theta pinch
[IPPJ-626] N83-27853
Numerical simulations for intense light-ion beam propagation in channel under influence of plasma inertia
[IPPJ-627] N83-27854
Measurement of the helical field of JIPP T-11
[IPPJ-625] N83-27855
Plasma behaviors in the open field region of reversed-field theta-pinch
[IPPJ-624] N83-27856
Simple method of sheet plasma production in lower pressure
[IPPJ-628] N83-27857
NARA WOMEN'S UNIV. (JAPAN).
Stopping powers of Zr, Pd, Cd, In and Pb for 6.5 MeV protons and mean excitation energies N83-27698
Geometrical effect on stopping power measurement (angle dependent energy loss) of 7 MeV protons N83-27699
Computer simulation of geometrical effects on the stopping power for 7 MeV protons N83-27700
NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL, ARLINGTON, VA.
Future Engineering Needs of Magnetic Fusion
[PB83-149757] N83-27874
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
Aeronautical Engineering: A continuing bibliography, 1982 cumulative index
[NASA-SP-7037(157)] N83-26784
Audio direct broadcast satellites N83-26857
Ambitious STS-7 mission to feature first landing at Kennedy
[NASA-NEWS-RELEASE-83-87] N83-26912
Aerospace Medicine and Biology: A continuing bibliography with indexes (supplement 246)
[NASA-SP-7011(246)] N83-27579
NASA STI-RECON Bulletin and Tech Info News
[NASA-CR-172685] N83-27904
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.
A flight-test and simulation evaluation of the longitudinal final approach and landing performance of an automatic system for a light wing loading STOL aircraft
[NASA-TM-84270] N83-26845
Pilot human factors in stall/spin accidents of supersonic fighter aircraft
[NASA-TM-84348] N83-26846
Aerodynamic characteristics of generalized bent biconic bodies for aero-assisted, orbital-transfer vehicles
[NASA-TM-84362] N83-26918
Calculation of boundary layers near the stagnation point of an oscillating airfoil
[NASA-TM-84305] N83-27148
Implicit upwind methods for the compressible Navier-Stokes equations
[NASA-TM-84364] N83-27149
Interaction of multiple supersonic jets with a transonic flow field
[NASA-TM-84369] N83-27152
Wildland inventory and resource modeling for Douglas and Carson City Counties, Nevada, using LANDSAT and digital terrain data
[E83-10302] N83-27293
Rate processes in gas phase
[NASA-RP-1090] N83-27809
Thermal conductance of pressed contacts at liquid helium temperatures
[NASA-TM-84365] N83-27876
Large Deployable Reflector Science and Technology Workshop. Volume 2: Scientific Rationale and Technology Requirements
[NASA-CP-2275] N83-27939
Smectites versus palagonites in Mars soil: Evidence from simulations of Viking biology labeled release experiments
[NASA-TM-84361] N83-27947
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.
Evaluation of mounting bolt loads for Space Shuttle Get Away Special (GAS) adapter beam
[NASA-TM-84988] N83-26910
Analysis of STS-3 Get Away Special (GAS) flight data and vibration specification for gas payloads
[NASA-TM-85000] N83-26911
Method for milling and drilling glass
[NASA-CASE-GSC-12636-1] N83-27058
LANDSAT-4 to ground station interface description
[E83-10292] N83-27291
Simulating soybean canopy temperature as affected by weather variables and soil water potential
[E83-10319] N83-27307
A computer program for the simulation of heat and moisture flow in soils
[E83-10342] N83-27317
Texture functions in image analysis: A computationally efficient solution
[NASA-TM-85022] N83-27326
Auroral kilometric radiation/aurora correlation
[NASA-TM-85035] N83-27516
Ordinary mode auroral kilometric radiation, with harmonics, observed by ISIS 1
[NASA-TM-85036] N83-27517
Is there any chlorine monoxide in the stratosphere?
[NASA-TM-85026] N83-27518
Relationships between field-aligned currents, electric fields and particle precipitation as observed by dynamics Explorer-2
[NASA-TM-85025] N83-27519
The impact of conventional surface data upon VAS regression retrievals in the lower troposphere
[NASA-TM-83987] N83-27522
The sensitivity of numerically simulated climates to land-surface boundary conditions
[NASA-TM-83985] N83-27536
RF radiation from lightning correlated with aircraft measurements during storm hazards-82
[NASA-TM-85007] N83-27537
Waterspout, gust fronts and associated cloud systems
[NASA-TM-85032] N83-27538
Rapid, quantitative determination of bacteria in water
[NASA-CASE-GSC-12158-1] N83-27569
Networking DEC and IBM computers
[NASA-TM-85019] N83-27633
Microcircuit radiation effects databank
[NASA-TM-85346] N83-27903
NASA/Goddard Space Flight Center contributions to the Workshop on Positron-Electron Pairs in Astrophysics
[NASA-TM-85027] N83-27928
An electron-positron jet model for the galactic center N83-27929
Comparison of photon-photon and photon-magnetic field pair production rates N83-27930
Pair production and annihilation in strong magnetic fields N83-27931
Low-temperature positron annihilation N83-27932
Upper limits to the annihilation radiation luminosity of Centaurus A N83-27933
Pair production near threshold in pulsar magnetic fields N83-27934
Electron-positron annihilation and the cosmic X-ray background N83-27935
The origin of the galactic annihilation radiation N83-27936
Criteria for grasar action in astrophysical sources N83-27937
Energetic-ion acceleration and transport in the upstream region of Jupiter: Voyager 1 and 2
[NASA-TM-85179] N83-27948
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LYNDON B. JOHNSON SPACE CENTER, HOUSTON, TEX.
Space flight experience with the Shuttle Orbiter control system N83-26900
Evaluation of trends in wheat yield models
[E83-10349] N83-27324
Bio-medical flow sensor
[NASA-CASE-MSC-18761-1] N83-27577
Apparatus for determining changes in limb volume
[NASA-CASE-MSC-18759-1] N83-27578
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, HAMPTON, VA.
Some historical trends in the research and development of aircraft
[NASA-TM-84665] N83-26785
Some recent applications of XTRAN3S
[NASA-TM-85641] N83-26815
Effects of varying podded nacelle-nozzle installations on transonic aeropropulsive characteristics of a supersonic fighter aircraft
[NASA-TP-2120] N83-26821
Effects of varying podded Nacelle-nozzle installations on transonic aeropropulsive characteristics of a supersonic fighter aircraft
[NASA-TP-120] N83-26823
Determination of stability and control parameters of a general aviation airplane from flight data
[NASA-TM-84635] N83-26844
Large Space Antenna Systems Technology, part 1
[NASA-CP-2269-PT-1] N83-26853
Pushbroom radiometry and its potential using large space antennas N83-26860
Systems design and comparative analysis of large antenna concepts N83-26863
A summary of mission and system performance requirements for large space antennas N83-26865
Spacecraft materials research: A NASA perspective N83-26866
Advances in structural concepts N83-26868
NASA/USAF research in structural dynamics N83-26870
Structures for large precision reflectors N83-26871
Inflated antennas N83-26877
Large Space Antenna Systems Technology, part 2
[NASA-CP-2269-PT-2] N83-26879
Results of studies at Langley Research Center on the control of large space systems N83-26887
Large space antenna communications systems: Integrated Langley Research Center/Jet Propulsion Laboratory technology development activities. 1: Introduction N83-26891
Large space antenna communications systems: Integrated Langley Research Center/Jet Propulsion Laboratory development activities. 2: Langley Research Center activities N83-26892
The need for space flight experiments and testing in the development of large space antenna systems technology N83-26896
Space Technology Experiment Platform (STEP). A Shuttle-borne support facility for structures, structural dynamics, and control technology flight experiments N83-26901
MAST space research flight experiment N83-26904
Slow crack growth in spinel in water
[NASA-TM-85644] N83-27017
Ultrasonic mixing of epoxy curing agents
[NASA-TM-85643] N83-27018
Heat-transfer distributions on biconics at incidence in hypersonic-hypervelocity He, N2, air, and CO2 flows
[NASA-TM-84667] N83-27150
Heating measurements on Space Shuttle Orbiter models with differentially deflected elevons
[NASA-TM-84646] N83-27151
A NASA high-power space-based laser research and applications program
[NASA-SP-464] N83-27200
Potential of minicomputer/array-processor system for nonlinear finite-element analysis
[NASA-TM-84566] N83-27259
SAM 2 measurements of the polar stratospheric aerosol. Volume 3: October 1979 to April 1980
[NASA-RP-1106] N83-27520
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.
Input generator for Denton 3-dimensional turbomachine-blade-row analysis code
[NASA-TM-23324] N83-26817
Dynamic distortion in a short s-shaped subsonic diffuser with flow separation
[NASA-TM-84312] N83-26838

Thrust performance of a variable-geometry, divergent exhaust nozzle on a turbojet engine at altitude
[NASA-TP-2171] N83-26839
Large space systems auxiliary propulsion requirements N83-26864
Scanning beam antenna conceptual design for 20/30 GHz satellite systems N83-26889
Near-field measurement facility plans at Lewis Research Center N83-26897
SAFE II: Large systems space plasma evaluation experiment N83-26903
Auxiliary propulsion requirements for large space systems
[NASA-TM-83388] N83-26922
The performance and application of high speed long life LH2 hybrid bearings for reusable rocket engine turbomachinery
[NASA-TM-84317] N83-26923
Advanced propulsion concepts for orbital transfer vehicles
[NASA-TM-83419] N83-26924
Correlation of compressive stress with spalling of plasma sprayed ceramic materials
[NASA-TM-83406] N83-27016
Processing of fused silicide coatings for carbon-based materials
[NASA-TM-83362] N83-27019
RF sputtered silicon and hafnium nitrides: Properties and adhesion to 440C stainless steel
[NASA-TM-83400] N83-27020
Thermal-barrier coatings for utility gas turbines
[NASA-TM-85349] N83-27022
Curved film cooling admission tube
[NASA-CASE-LEW-13174-1] N83-27144
Rolling-element bearings
[NASA-RP-1105] N83-27214
Zirconium carbide as an electrocatalyst for the chromous-chromic redox couple
[NASA-CASE-LEW-13246-1] N83-27344
Test results and description of a 1-kW free-piston Stirling engine with a dashpot load
[NASA-TM-83407] N83-27346
Fabrication of low-cost Mod-OA wood composite wind turbine blades
[NASA-TM-83323] N83-27347
JT150 1/2-scale nozzle jet noise experiment and comparison with prediction
[NASA-TM-83370] N83-27793
Low flight speed acoustic results for a supersonic inlet with auxiliary inlet doors
[NASA-TM-83411] N83-27794
DOE/NASA Automotive Stirling Engine Project overview '83
[NASA-TM-83405] N83-27924

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.
Antenna technology for orbital Very Long Baseline Interferometry (VLBI) N83-26859
Practical approaches to the design of control systems for large space structures N83-26886
Safe on-orbit experiment for measurement of large structures dynamics N83-26902
SAFE II: Large systems space plasma evaluation experiment N83-26903
SADE: A space experiment to demonstrate structural assembly N83-26906
An efficient algorithm for generating random number pairs drawn from a bivariate normal distribution
[NASA-TP-2173] N83-27679
Development of a simplified optical technique for the simultaneous measurement of particle size distribution and velocity
[NASA-TP-2185] N83-27846

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. PASADENA OFFICE, CALIF.
Waveguide cooling system
[NASA-CASE-NPO-15401-1] N83-27085
Electronic system for high power load control
[NASA-CASE-NPO-15358-1] N83-27126
Particle analyzing method and apparatus
[NASA-CASE-NPO-15292-1] N83-27184

NATIONAL BUREAU OF STANDARDS, BOULDER, COLO.
A survey of near-field testing methods for large aperture antennas and future trends N83-26896

NATIONAL BUREAU OF STANDARDS, WASHINGTON, D.C.
Passive films, surface structure and stress corrosion and crevice corrosion susceptibility
[AD-A124879] N83-26995
Calibration and related measurement service of the National Bureau of Standards
[PB83-151662] N83-27199
Mean excitation energies for use in Bethe's stopping-power formula N83-27703

NATIONAL COAL BOARD, LEATHERHEAD (ENGLAND).
Fluidised-bed combustion. Initial results obtained in a 1-ft by 1-ft fluidised-bed combustor operating at pressures up to 20 ATM
[DE83-005956] N83-26974

NATIONAL FERTILIZER DEVELOPMENT CENTER, MUSCLE SHOALS, ALA.
TVA/DOE integrated onfarm alcohol production system, phase 2
[DE82-016973] N83-27049
Overview of fuel alcohol from agricultural crops with emphasis on the Tennessee Valley
[DE82-016932] N83-27050

NATIONAL LAB. FOR HIGH ENERGY PHYSICS, IBARAKI-KEN (JAPAN).
The RF system of the photon factory injector linac N83-27761

NATIONAL MARITIME INST., FELTHAM (ENGLAND).
Observation and measurement of air flow over water waves
[NMI-R-122] N83-27145
Mean wave drift forces: Theory and experiment
[NMI-R-124] N83-27146
Interference effects on the drag loading for groups of cylinders in uni-directional flow
[NMI-R-130] N83-27147
Open water experiments on an ROV thruster
[NMI-R-143] N83-27212
Phase variation in wave force data
[NMI-R-132] N83-27253
Wave forces on circular cylinders with large excrescences at low Keulegan and Carpenter numbers
[NMI-R-133] N83-27254
A comparison of two methods for calculating wave drift forces
[NMI-R-137] N83-27255
Report on the West Sole Wind Structure Project 1982
[NMI-R-145] N83-27535

NATIONAL RESEARCH INST. FOR MATHEMATICAL SCIENCES, PRETORIA (SOUTH AFRICA).
SCRAP: A language for systems programming
[CSIR-TWISK-263] N83-27614
A categorized theory of bilinear systems over a ring
[CSIR-TWISK-264] N83-27638

NATIONAL SCIENCE FOUNDATION, WASHINGTON, D.C.
End-Use Products of Fusion Energy: Alternatives and Their Implications to the Fusion Energy R and D Strategy
[PB83-151696] N83-27873

NATIONAL TRANSPORTATION SAFETY BOARD, WASHINGTON, D. C.
Aircraft accident report: IBEX Corporation Gates Learjet 23, N100TA, Atlanta, near Savannah, Georgia, 6 May 1982
[PB83-910401] N83-26827

NAVAL AIR DEVELOPMENT CENTER, WARMINSTER, PA.
Statistical review of counting accelerometer data for Navy and Marine fleet aircraft
[AD-A124966] N83-26834

NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIF.
Finite element program for calculating flows in turbomachines with results for NASA task-1 compressor
[AD-A124987] N83-26841
Cost analysis of Navy acquisition alternatives for the NAVSTAR Global Positioning System
[AD-A125017] N83-26909
A study of the effect of interrupted quenches on a thermomechanically processed high carbon steel
[AD-A124985] N83-26996
An investigation of the effectiveness of smoke suppressant fuel additives for turbojet applications
[AD-A125025] N83-27034
Estimating survival probability or reliability: Simulation assessments of the Delta method, Jacknife and bootstrap
[AD-A125000] N83-27249
Optimization of three dimensional combined truss/frame structures
[AD-A124988] N83-27263
SoutHern Hemisphere application of the Navy nested tropical cyclone model
[AD-A125011] N83-27545
Numerical simulation of the influence of small scale mountain ranges on a baroclinic wave
[AD-A125301] N83-27546
Satellite applications to acoustic prediction systems
[AD-A125027] N83-27564
Hand-held computer programs for preliminary helicopter design
[AD-A125036] N83-27624
Probabilistic design using numerical optimization
[AD-A125232] N83-27651
Computerized measurement and tracking of acoustical resonances
[AD-A125286] N83-27799
Instrumental photon activation analysis using the linear accelerator at the Naval Postgraduate School
[AD-A125003] N83-27811
Scintillation analysis of gamma radiation with crystals of bismuth germanate
[AD-A124991] N83-27882
Application of computer modeling to the study of the thermodynamic forces acting on a building
[AD-A125227] N83-27894

NAVAL RESEARCH LAB., WASHINGTON, D. C.
Ignition of flamelets behind incident shock waves and the transition to detonation
[AD-A125217] N83-26939
Ionospheric irregularities and their potential impact on synthetic aperture radars
[AD-A124942] N83-27100
A new technique for reducing radar response to signals entering antenna sidelobes
[AD-A125191] N83-27101
A free electron laser driven by a long pulse induction linac
[AD-A125221] N83-27202
Laser welding of structural alloys N83-27228
Effect of joint design and fabrication limitations on tube-to-tubesheet welding N83-27235
Bathymetric data and analysis for the NRL remote sensing experiment: Phelps Bank, July 1982
[AD-A125220] N83-27563

NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER, ANNAPOLIS, MD.
Electrical system waveform distortion N83-27107

NAVAL SURFACE WEAPONS CENTER, WHITE OAK, MD.
Perturbed stationary-state description of the polarization effect in innershell ionization N83-27705

NAVAL WEAPONS CENTER, CHINA LAKE, CALIF.
A study of solvent and aqueous cleaning of fluxes
[AD-A124950] N83-26994
Human information processing guidelines for decision-aiding displays
[AD-A124858] N83-27599

NAVAL WEAPONS SUPPORT CENTER, CRANE, IND.
Evaluation program for secondary spacecraft cells. Cycle life test
[NASA-CR-172679] N83-27351
Evaluation program for secondary spacecraft cells. Cycle life test
[NASA-CR-172680] N83-27352

NAVY PERSONNEL RESEARCH AND DEVELOPMENT CENTER, SAN DIEGO, CALIF.
Validation of brain event-related potentials as indicators of cognitive styles, abilities, and aptitudes
[AD-A125292] N83-27593
Implementation of planned change: A review of major issues
[AD-A125193] N83-27900

NEW ENGLAND NUCLEAR CORP., CHELMSFORD, MASS.
A variable strength permanent magnet dipole N83-27745

NEW HAMPSHIRE UNIV., DURHAM.
Behavior of a rigid inclusion stressmeter in an anisotropic field
[DE82-016063] N83-27188

NEW MEXICO STATE UNIV., LAS CRUCES.
Data report for the Southwest Residential Experiment Station, February 1982
[DE82-016330] N83-27398

NEW MEXICO UNIV., ALBUQUERQUE.
Economic analysis of the integrated heating and cooling potential of a residential passive-solar water wall design
[DE82-018372] N83-27419
Small hydroelectric power plant for Aztec, New Mexico
[DE82-903957] N83-27432
Performance surfaces of adaptive predictors structures
[DE82-020090] N83-27663

NEW YORK UNIV., NEW YORK.
Effective charge of energetic ions in metals N83-27715
Effective charge of low-velocity nitrogen, neon and argon ions in carbon, aluminum and gold N83-27716

NIHON UNIV., TOKYO (JAPAN).
Effects of radial support stems on the disk-and-washer structure N83-27743

NIPPON KOKAN K. K., KAWASAKI (JAPAN).
Electron beam welding for heavy section steel plates N83-27229

NIPPON STEEL CORP., KAWASAKI (JAPAN).
High temperature properties of the seam weld portion in 1% Cr-0.5% Mo ERW boiler tubing after long-term aging N83-27223

NOOTER CORP., ST. LOUIS, MO.
Processes quality assurance and examination of weld metal overlays N83-27220
NORTH CAROLINA STATE UNIV., RALEIGH.
Development of improved analytical models for mesh reflector surfaces N83-26895
NORTHEASTERN UNIV., BOSTON, MASS.
Evaporated lithium-doped amorphous silicon solar cells
[DE82-016078] N83-27400
NUCLEAR RESEARCH CENTER, KARLSRUHE (WEST GERMANY).
The linear accelerator for the proposed German spallation source N83-27728

O

OAK RIDGE ASSOCIATED UNIVERSITIES, TENN.
Laser measurements and nuclear structure
[DE82-017528] N83-27816
OAK RIDGE ASSOCIATED UNIVERSITIES, INC., WASHINGTON, D.C.
Proceedings of the Carbon Dioxide Research Conference: Carbon Dioxide, Science and Consensus
[DE83-007182] N83-27551
OAK RIDGE GASEOUS DIFFUSION PLANT, TENN.
National Uranium Resource Evaluation Program: Supplement to hydrogeochemical and stream sediment reconnaissance basic data reports K/UR-405 and K/UR-406 through K/UR-443 GJBX-88(82)]
[DE82-013774] N83-27336
OAK RIDGE NATIONAL LAB., TENN.
Comparison of neutron and heavy-ion damage in a stable austenite
[DE82-017369] N83-27009
Analysis of elevated-temperature tensile and creep properties of normalized and tempered 2-1/4 Cr-1 Mo steel
[DE82-018160] N83-27010
Response of bainitic 2 1/4 Cr-1 Mo steel to creep-fatigue loadings at 482 deg C
[DE82-017445] N83-27011
Calorimeter for measuring ac magnetic losses in small samples
[DE82-018167] N83-27192
International Conference on Welding Technology for Energy Applications
[DE83-006404] N83-27215
Pneumatic conveying of coal and coal-limestone mixtures as applied to atmospheric fluidized-bed combustion
[DE82-015694] N83-27243
International energy technology assessment: Atmospheric fluidized-bed combustion
[DE82-012430] N83-27404
Biosolar hydrogen and oxygen production
[DE82-017491] N83-27428
Photosynthetic water splitting
[DE82-017315] N83-27429
Testimony presented to Subcommittee on Energy Development and Applications, US House of Representatives. Hearings on renewable energy in the eighties: Needs for further research, development and demonstration
[DE82-017407] N83-27430
Economic evaluation of end-user conservation measures applied to buildings served by a proposed district-heating system
[DE82-016080] N83-27470
Use of DOE/RECON in environmental protection
[DE82-017506] N83-27499
Meteorological Effects of Thermal Energy Releases (METER) program
[DE83-006313] N83-27502
Processes of atmospheric deposition of metals and acids to forests
[DE82-017442] N83-27504
The ISOLR: An isometric plotting package for use with ORPLOT
[DE82-015819] N83-27627
New FORTRAN computer programs to acquire and process isotropic mass-spectrometric data
[DE82-019901] N83-27629
Charge States and Dynamic Screening of Swift Ions in Solids
[DE83-006799] N83-27697
The stopping power of an electron gas for slow ions N83-27708
Energy losses to surface plasmons by charged particles N83-27713
Emission of high-energy, light particles from intermediate-energy heavy-ion reactions
[DE82-017403] N83-27815
Laser-optical studies of the spontaneous-fission isomer /sup 240m/Am
[DE82-017433] N83-27817
The incorporation of particle collisions in the time-dependent Hartree-Fock approximation
[DE82-017481] N83-27818
Folding models for elastic and inelastic scattering
[DE82-017426] N83-27819
Experimental studies on pump limiters
[DE82-017408] N83-27868
Experimental characterization of the flux-line lattice in superconducting V3Si
[DE83-004647] N83-27888
Fluxoid pinning by grain boundaries in bicrystals and polycrystals of niobium
[DE82-017405] N83-27891
Coordination of Physical, Chemical, and Thermodynamic Properties for Coal Conversion: Proceedings of the Oak Ridge Conference
[DE83-007169] N83-27898
Documenting content of technical databases
[DE82-017526] N83-27914
Database automation of accelerator operation
[DE82-017525] N83-27915
OCCIDENTAL RESEARCH CORP., IRVINE, CALIF.
Methane recovery from horizontal holes in advance of mining
[DE82-017673] N83-27337
OFFICE OF TECHNOLOGY ASSESSMENT, WASHINGTON, D.C.
Increased automobile fuel efficiency and synthetic fuels: Alternatives for reducing oil imports. Background paper number 2: Selected technical and economic comparison of synthetic options
[PB83-147363] N83-27057
OHIO STATE UNIV., COLUMBUS.
Transient heat flow along uni-directional fibers in composites
[AD-A122926] N83-26929
ONE AMERICA, INC., WASHINGTON, D.C.
Waste-to-energy compendium: Revised 1982 edition
[DE82-020328] N83-27471
Urban-waste program research and development 1978-1981: An overview
[DE82-019788] N83-27514

P

PACIFIC MISSILE TEST CENTER, POINT MUGU, CALIF.
Tidal and lunar data for Point Mugu, San Nicolas Island, and the Barking Sands area during 1983
[AD-A124810] N83-27565
PACIFIC NORTHWEST LAB., RICHLAND, WASH.
Aquifer thermal-energy-storage costs with a seasonal-chill source
[DE83-006700] N83-27382
A new look at turbulence experienced by a rotating wind turbine
[DE83-007044] N83-27383
Operations requirements of utilities with wind-power generation
[DE83-007051] N83-27394
Geotechnical factors and guidelines for storage of compressed air in solution-mined salt cavities
[DE82-017611] N83-27465
Pacific Northwest Laboratory report to the DOE Office of Energy Research. Part 2: Environmental sciences
[DE83-007586] N83-27481
Terrestrial and riverine ecology N83-27482
Marine research N83-27483
Ecological effects of coal conversion N83-27484
Solid wastes: Mobilization, fate and effects N83-27485
Radionuclide fate and effects N83-27486
Statistical and theoretical research N83-27487
Pacific Northwest Laboratory report to the DOE Office of Energy Research. Part 3: Atmospheric sciences
[DE83-007472] N83-27488
Transformation of energy-related pollutants N83-27489
Atmospheric diffusion in complex terrain N83-27490
Atmospheric boundary layer studies N83-27491
Atmospheric diffusion in complex terrain N83-27492
Atmospheric boundary layer studies N83-27493
Air pollution dry deposition: Radioisotopes as particles and volatiles N83-27494
Oil shale fugitive air emissions N83-27495
Particle resuspension and translocation N83-27496
Theoretical studies and application N83-27497
New pollutant dispersion model for application in mountain valleys
[DE83-005289] N83-27509
Analysis of ANSI N13.11: The performance algorithm
[DE82-019212] N83-27628
User manual AQUASTOR: A computer model for cost analysis of aquifer thermal-energy storage coupled with district heating or cooling systems. Volume 2: Appendices
[DE82-013889] N83-27631
Ultrasonic system characterization
[DE82-019210] N83-27804
PEDCO-ENVIRONMENTAL SPECIALISTS, INC., CINCINNATI, OHIO.
Acid rain: Control strategies for coal-fired utility boilers, volume 1
[DE83-006695] N83-27511
PENNSYLVANIA STATE UNIV., UNIVERSITY PARK.
End wall flow characteristics and overall performance of an axial flow compressor stage
[NASA-CR-3671] N83-26819
Relation of coal characteristics to liquefaction behavior. Part 2: Continuous flow reactor studies by Gulf Research and Development Co.
[DE82-016938] N83-27048
Investigation of the coupling of unsteady lift to low order acoustic duct modes in an axial flow fan
[AD-A124819] N83-27796
PENNSYLVANIA UNIV., PHILADELPHIA.
Mechanisms of damage accumulation in time-dependent cyclic deformation
[DE83-000993] N83-27002
Biological production of liquid fuels from biomass
[DE82-008652] N83-27048
PHILIPS G.M.B.H., AACHEN (WEST GERMANY).
Transparent Heat Reflecting Coatings (THRC) based on highly doped tin oxide and indium oxide N83-27362
PHYSICAL REVIEW LETTERS, RIDGE, N.Y.
Stopping of swift ions in condensed matter: The theory of effective charge N83-27714
PHYSICAL SCIENCES, INC., ANDOVER, MASS.
Synthetic-fuel combustion: Pollutant formation. Scot-initiation mechanisms in burning aromatics
[DE83-005611] N83-26945
PHYSICAL SCIENCES, INC., WOBURN, MASS.
Pulverized fuel and scaleup methodologies
[DE82-014822] N83-26962
Ammonia-air fuel cell power plant systems analysis
[DE82-018914:] N83-27464
PITTSBURGH AND MIDWAY COAL MINING CO., ENGLEWOOD, COLO.
Solvent Refined Coal (SRC) process. Corrosion-erosion study
[DE82-011499] N83-26966
PITTSBURGH ENERGY TECHNOLOGY CENTER, PA.
Proceedings of the 4th International Symposion on Coal-Slurry Combustion, volume 1
[DE82-016335] N83-26944
PITTSBURGH UNIV., PA.
Addition of devolatilization equations to SYNTHANE computerized mathematical model
[DE83-006243] N83-27444
Efficiency of buffered aqueous carboxylic acid solutions and organic solvents to absorb SO2 from industrial flue; solubility data from gas-liquid chromatography
[DE83-005405] N83-27510
ARIS: Acid Rain Information System
[DE83-007026] N83-27512
Knowledge and skill differences in novices and experts
[AD-A124466] N83-27592
Existence of unbiased covariance components estimators
[AD-A125299] N83-27650
POLISH ACADEMY OF SCIENCES, WARSAW.
Kinetics of void formation in strained metals
[ISSN-0208-5658] N83-26993
The influence of some second order effects on the behaviour of rigid plastic shells at the yield point load
[ISSN-0208-5658] N83-27252
Papers on techniques of program design
[ISSN-0208-5658] N83-27613
PRATT AND WHITNEY AIRCRAFT, EAST HARTFORD, CONN.
Compound-compressible nozzle flow N83-26790
PRATT AND WHITNEY AIRCRAFT GROUP, EAST HARTFORD, CONN.
Model aerodynamic test results for a refined actuated inlet ejector nozzle at simulated takeoff and cruise conditions
[NASA-CR-168051] N83-26816
PRINCETON UNIV., N. J.
Ideal MHD stability calculations in axisymmetric toroidal coordinate systems
[DE82-009830] N83-27866
PURDUE UNIV., LAFAYETTE, IND.
Gasification in pulverized coal flames. Investigation of pulverized coal-combustors and gasifiers: Multiple sub-reactor model and experimental results, part 2
[DE82-013001] N83-26965

Application of modern control theory for building structures
[PB83-144147] N83-27080
Reliability aspects of structural control
[PB83-145482] N83-27082
The development of a reduced-order functional representation of an alternator-rectifier excitation system aut 01Chen-Chen
[DE83-006437] N83-27133
Parallel processing implementations of a contextual classifier for multispectral remote sensing data
[E83-10273] N83-27285
Kinetic mechanism for fuel-nitrogen conversion in lean to rich flames
[DE82-905467] N83-27356
Domestic olivine versus magnesite as a thermal energy storage material: Performance comparisons for electrically heated room-size units in accordance with ASHRAE standard 94.2
[DE82-017389] N83-27466

Q

QUEEN ELIZABETH COLL., LONDON (ENGLAND).
A review of the current state of European research and knowledge concerning the biological effects of radiowaves and microwaves
[AD-A125205] N83-27582

R

R AND D ASSOCIATES, MARINA DEL REY, CALIF.
Concept evaluation of automotive propulsion using liquid air/nitrogen
[DE82-016992] N83-27927
RADIAN CORP., AUSTIN, TEX.
Simulated heat-exchanger tubes: DOE Geothermal Test Facility, East Mesa, California
[DE83-007415] N83-27391
RAND CORP., SANTA MONICA, CALIF.
Household energy conservation: Strategies for behavioral research
[RAND/N-1909-DOE] N83-27349
An appraisal of evaluations of utility sponsored programs for residential energy conservation
[RAND-N-1925-DOE] N83-27350
After energy price decontrol: The role of government conservation programs
[RAND/N-1903-DOE] N83-27922
RAYTHEON CO., SUDBURY, MASS.
Modular incoherent CO sub 2 TEA lasers
[AD-A124960] N83-27204
RENSSELAER POLYTECHNIC INST., TROY, N. Y.
Sensitivity to sound speed of surface/bottom reflecting transmissions in a deep ocean channel
[AD-A125278] N83-27800
RESEARCH INST. OF NATIONAL DEFENCE, LINKOEPING (SWEDEN).
Simulation program of rotary wings
[FOA-C-30308-E1] N83-26836
Simulation of multipath propagation on digital radiolinks
[FOA-A-30032-E2] N83-27111
Electromagnetic pulse protective properties in transient suppressors consisting of gas discharge tubes and filters
[FOA-C-30312-A3] N83-27142
Laser safety of air bathymetry
[FOA-C-30292-E1] N83-27210
Interface unit for relative humidity measurement with dew point meter
[FOA-C-30309-E] N83-27556
Equipment for recording the direction of incidence of infrasonic sound waves. Technical description
[FOA-C-30307-E1] N83-27807
RESEARCH INST. OF NATIONAL DEFENCE, STOCKHOLM (SWEDEN).
Boron-containing fuel-rich HTBP propellants. Manufacturing, burning experiments and specific impulse calculations
[FOA-C-20483-D1] N83-27055
Sensitivity of electric explosive devices to electromagnetic pulses: An estimation for assessing hazards in connection with stray fields from an electromagnetic pulse stimulator
[FOA-C-20485-D1(D4)] N83-27056
Survival; motivation; preparation
[FOA-C-54045-H1] N83-27598
RESEARCH INST. OF NATIONAL DEFENCE, UMEA (SWEDEN).
Silanization: Chemical surface modification of solid surfaces by silane coupling agents
[FOA-C40166-C2(B2/A3)] N83-26984
RESOURCE TRANSITIONS, INC., SANTA CRUZ, CALIF.
Energy future Santa Cruz. A citizens plan for energy self-reliance: Executive summary
[PB83-136978] N83-27474
Energy future Santa Cruz: A citizens' plan for energy self-reliance
[PB83-136960] N83-27475
RHODE ISLAND UNIV., KINGSTON.
Geology and mineral resources of the Providence 1 deg by 2 deg NTMS quadrangle, Connecticut-Massachusetts-Rhode Island N83-27331
A prony methody for noisy data: Choosing the signal components and selecting the order in exponential signal models
[AD-A124897] N83-27646
ROCKEFELLER UNIV., NEW YORK.
Diffractive interactions of hadrons at high energies
[DE82-019463] N83-27830
ROCKETDYNE, CANOGA PARK, CALIF.
Hybrid hydrostatic/ball bearings in high-speed turbomachinery
[NASA-CR-168124] N83-27213
Downhole steam-generator study. Volume 1: Conception and feasibility evaluation
[DE82-018348] N83-27424
ROCKWELL INTERNATIONAL CORP., CANOGA PARK, CALIF.
An overview of the Solar in Federal Buildings Demonstration Program (SFBP)
[DE83-005757] N83-27452
ROCKWELL INTERNATIONAL CORP., DOWNEY, CALIF.
Development of deployable structures for large space platform systems, volume 1
[NASA-CR-170689] N83-26919
ROCKWELL INTERNATIONAL CORP., GOLDEN, COLO.
Wind-systems technical notes: 1981
[DE83-007202] N83-27384
Technical and management support for the development of small wind systems
[DE83-007197] N83-27461
Comparison of estimators of beta parameters for fitting binomial data with varying p
[DE83-006641] N83-27690
ROCKWELL INTERNATIONAL CORP., THOUSAND OAKS, CALIF.
Sintering phenomena of non-oxide silicon compounds
[DE83-007332] N83-26932
Growth and characterization of Czochralski-grown n and p-type GaAs for space solar cell substrates
[NASA-CR-168099] N83-27877
Synthetic studies of antimony sulfur iodide and predictions/synthesis of new nitrogen containing crystal structures
[AD-A124977] N83-27881
ROLLS-ROYCE LTD., DERBY (ENGLAND).
Method of studying the operating temperature of gas turbines
[PNR-90159] N83-26842
Interaction of ceramics with molten materials during directed crystallization
[PNR-90155] N83-27030
Production planning, production systems for flexible automation
[PNR-90150] N83-27067
Present situation in development of automated machining systems in Europe and America
[PNR-90152] N83-27068
The servicing of complex NC manufacturing systems
[PNR-90153] N83-27069
Example of a planned and implemented flexible manufacturing system suitable for development in stages
[PNR-90154] N83-27070
Time characteristic, capacity and conditions for the adoption of flexible production systems
[PNR-90156] N83-27071
Surface grinding at high power avoiding thermal edge zone damage
[PNR-90161] N83-27072
Creep feed (single path) and conventional (multi-path) grinding - surface structure and comparison
[PNR-90162] N83-27073
Creep-feed grinding: A modern variant of the plane surface grinding process
[PNR-90163] N83-27074
Technological characteristics of creep-feed grinding. Raised cutting forces and reduced work piece temperatures, part 2
[PNR-90164-PT-2] N83-27075
Design requirements for creep-feed grinders, part 3. Application of outside diameter creep-feed grinding, part 4
[PNR-90165-PT-3/4] N83-27076
Automatable tool system for turning operations
[PNR-90166] N83-27077
Calculation of the unsteady flow through relatively moving blade rows and the unsteady blade forces
[PNR-90158] N83-27183
Evaluation of the detection capacity of methods of monitoring data reliability
[PNR-90160] N83-27677
Investigation into the availability levels of flexible production systems
[PNR-90157] N83-27902
ROYAL INST. OF TECH., STOCKHOLM (SWEDEN).
Experimental study of strength and existance domain of ground-to-air inlet vortices by ground board static pressure measurements
[PB83-144865] N83-26843

S

SAN DIEGO GAS AND ELECTRIC CO., CALIF.
Heber Binary Project. Binary Cycle Geothermal Demonstration Power Plant (RP1900-1) N83-27375
SANDIA LABS., ALBUQUERQUE, N. MEX.
Performance optimization of PCM/SCO telemetry systems
[DE82-015797] N83-26917
Quantitative analysis of phosphosilicate glass films on silicon wafers
[DE82-017642] N83-26953
High-resolution stimulated Raman spectroscopy
[DE82-013490] N83-26956
Shock-wave response of titanium sunhydride-potassium perchlorate
[DE82-016739] N83-27043
Effects of particle characteristics on performance of RRSK PETN
[DE82-018553] N83-27044
General mechanism analysis package
[DE82-008158] N83-27060
Design and simulation of a unique signal mechanism
[DE82-011568] N83-27110
Sandia Micro Generation for Integrated Circuits (SMAGIC) system and the hierarchical artwork (HAT) language
[DE82-009912] N83-27134
Dielectrics for radiation-hard capacitors: Polyvinylidene fluoride and polyethylene terephthalate
[DE82-019903] N83-27137
Computer assistance for the design of electronic components
[DE82-008920] N83-27138
MARIAH: A finite-element computer program for incompressible porous-flow problems, user's manual
[DE83-006847] N83-27167
A general-purpose computer code for predicting chemical-kinetic behavior behind incident and reflected shocks
[DE82-015878] N83-27169
Mass flow measurement of solids/gas stream using radiometric techniques
[DE82-017028] N83-27170
Laboratory simulation of a deep-ocean in-situ heat-transfer experiment
[DE82-018656] N83-27171
Concentration solar-cell flash tester
[DE82-018551] N83-27195
Intercomparison of water triple point cells and standard platinum resistance thermometers
[DE83-005971] N83-27196
Analysis of streak-camera measurement errors caused by misorientation of the camera slit with recording direction
[DE83-005970] N83-27197
Shock-hardened, high-frequency, PCM system with memory for Earth-penetrator-study applications
[DE82-017644] N83-27242
Project DEEP STEAM
[DE82-016394] N83-27389
Geo energy research and development: Technology transfer update
[DE83-007225] N83-27395
Intermediate photovoltaic system application experiment operational performance. Executive summary for Newman Power Station, El Paso, Texas
[DE82-019965] N83-27407
Intermediate photovoltaic system application experiment operational performance. Executive summary for Oklahoma Center for Science and Arts, Oklahoma City, Oklahoma
[DE82-019964] N83-27408
Intermediate photovoltaic system application experiment operational performance. Executive summary. Volume 6: Beverly High School, Beverly, Massachusetts
[DE82-015660] N83-27409

Intermediate photovoltaic system application experiment operational performance. Executive summary for Beverly High School, Beverly, Massachusetts
[DE82-019967] N83-27410

Intermediate photovoltaic system application experiment operational performance. Executive summary for CDC Light Manufacturing Building, San Bernardino, California
[DE82-019962] N83-27411

Intermediate photovoltaic system application experiment operational performance. Executive summary for Mississippi County Community College, Blytheville, Arkansas
[DE82-019966] N83-27412

Optimized low-cost-array field designs for photovoltaic systems
[DE82-013640] N83-27435

Intermediate photovoltaic system application experiment operational performance report, for April 1982. Volume 2: For Mississippi County Community College, Blytheville, Arkansas
[DE83-006446] N83-27439

Intermediate photovoltaic system application experiment operational performance report, for September 1982. Volume 5: For Oklahoma Center for Science and Arts
[DE83-006448] N83-27440

Intermediate photovoltaic system application experiment operational performance report, for October 1982. Volume 16: For Lovington Square Shopping Center, Lovington, New Mexico
[DE83-006447] N83-27441

Intermediate photovoltaic system application experiment operational performance report. Volume 16: For Newman Power Station, El Paso, Texas for October 1982
[DE83-006445] N83-27442

Experimental results of pitching moment tests on parabolic-trough solar-collector array configurations
[DE83-006027] N83-27446

DRAC: A user-friendly computer code for modeling transient thermohydraulic phenomena in solar-receiver tubing
[DE83-007091] N83-27458

Lithium/SO2 cathode studies
[DE82-012777] N83-27462

Improvements in Li(Si)/FeS2 thermal battery technology
[DE82-017779] N83-27463

The National Seismic Station
[DE82-018224] N83-27527

Department of Energy's Western Gas Sands Project multi-well experiment update
[DE82-018291] N83-27529

Sedimentology of the Mesaverde formation of Rifle Gap, Colorado and implications for gas-bearing intervals in the subsurface
[DE82-013396] N83-27530

Simulated monitor display for CCTV
[DE82-017020] N83-27552

Meteorological tower data, Grand Junction Tailings Site, Colorado
[DE82-018919] N83-27555

Application of a bubble memory to a balloon-borne data system
[DE82-018415] N83-27611

Description and operating procedure for magma characterization data acquisition and control system
[DE82-015653] N83-27625

Use of the C language pre-processor in the RT-11 FORTRAN environment
[DE82-010076] N83-27626

Automatic test generation using a matrix model of digital systems
[DE82-009988] N83-27693

Sandia Helicopter Acoustic Detector (SHAD)
[DE82-018925] N83-27803

Acoustic emissions during deformation of intact and jointed welded tuff
[DE82-018346] N83-27805

Retention and recycling of plasma-edge hydrogen isotopes in C and TiC
[DE82-019959] N83-27814

High-average-power electron accelerators for generating gigawatt microwave pulses
[DE83-006808] N83-27821

Beam broadening in a strongly scattering target in the analytical electron micropscope
[DE82-014085] N83-27825

Analysis of electronic desorption
[DE82-018591] N83-27832

Inertial fusion research based on pulsed power
[DE82-018294] N83-27863

Electronic-energy-band structure of uranium hydride
[DE82-016393] N83-27884

Automated C-V and Y omega meson curves for MOS device analysis
[DE82-014268] N83-27886

Mechanisms of electronic description
[DE82-018590] N83-27887

SANDIA LABS., LIVERMORE, CALIF.

Ignition and flame-propagation studies with adaptive numerical grids
[DE83-005462] N83-26976

SANDIA LABS., TONOPAH, NEV.

Determining light intensity for use with intermittent or rotating prism cameras utilizing a cinematographic light-intensity translator
[DE82-015414] N83-27189

SCHOOL OF AEROSPACE MEDICINE, BROOKS AFB, TEX.

Estimating aircrew fatigue: A technique with application to airlift operations
[AD-A125319] N83-27594

SCIENCE APPLICATIONS, INC., CHATSWORTH, CALIF.

Spray combustion of synthetic fuels. Phase 2: Spray-combustion phenomena
[DE82-015489] N83-26970

SCIENCE APPLICATIONS, INC., DAYTON, OHIO.

Cross correlation analysis to determine the environmental parameters correlated with electro-optical system performance
[AD-A124886] N83-27544

SCIENCE APPLICATIONS, INC., LA JOLLA, CALIF.

Application of numerical simulation methodology to automotive combustion
[DE82-015912] N83-27247

SCIENCE APPLICATIONS, INC., PALO ALTO, CALIF.

Development of variable-shaft-speed alternator
[DE82-012334] N83-27139

SCIENTIFIC SYSTEMS, INC., CAMBRIDGE, MASS.

Current status of system identification methodology N83-26883

SCIENTIFIC TRANSLATION SERVICE, SANTA BARBARA, CALIF.

An investigation of the dynamics of the plasma corona
[DE82-019397] N83-27867

SCRIPPS INSTITUTION OF OCEANOGRAPHY, LA JOLLA, CALIF.

Investigations of the 1 KHz sound absorption in sea water
[AD-A124888] N83-27797

SHAWINIGAN ENGINEERING CORP., MONTREAL (QUEBEC).

Increased efficiency of hydroelectric power
[DE82-905771] N83-27403

SIERRA GEOPHYSICS, INC., REDMOND, WASH.

Three-dimensional wave propagation using boundary integral equation techniques
[AD-A124956] N83-27103

SIERRACIN/INTREX PRODUCTS, CHATSWORTH, CALIF.

Continuous coating of indium tin oxide onto large area flexible substrates N83-27370

SINACORI (JOHN B.) ASSOCIATES, HOLLISTER, CALIF.

Research and analysis of head-directed area-of-interest visual system concepts
[NASA-CR-166480] N83-26849

SOUTH CAROLINA UNIV., COLUMBIA.

Moment-rotation characteristics of semi-rigid steel beam-column connections
[PB83-145318] N83-27081

A general approach to the testing of binary solubility systems for thermodynamic consistency. Consolidated Fuel Reprocessing Program
[DE83-007173] N83-27897

SOUTHEASTERN CENTER FOR ELECTRICAL ENGINEERING EDUCATION, INC., ST. CLOUD, FLA.

Basic EMC technology advancement for C3 systems. Volume 4A: Coupling of electromagnetic fields onto transmission lines. A comparison of the transmission of line model and the method of moments
[AD-A124861] N83-27102

SOUTHERN METHODIST UNIV., DALLAS, TEX.

Establishment of a center of excellence for applied mathematical and statistical research
[E83-10307] N83-27297

On the relationship between functions with the same optimal knots in spline with piecewise polynomial approximation
[AD-A125002] N83-27662

One-sided tolerance limits for balanced one-way ANOVA random model
[AD-A125026] N83-27669

A simple approximation for bivariate normal probabilities
[AD-A125033] N83-27687

SPECTRON DEVELOPMENT LABS., INC., COSTA MESA, CALIF.

Feasibility study of three-dimensional holographic interferometry for aerodynamics
[NASA-CR-166483] N83-27845

SRI INTERNATIONAL CORP., MENLO PARK, CALIF.

Identification and cleavage of breakable single bonds by selective oxidation, reduction, and hydrolysis
[DE82-016800] N83-26957

STANFORD LINEAR ACCELERATOR CENTER, CALIF.

Fractional charge search
[DE82-018607] N83-27194

CID thermionic gun system N83-27739

Beam parameter measurements for the SLAC linear collider N83-27753

Design of an electron beam spectral modification system N83-27779

A finite-particle-number approach to physics
[DE83-007014] N83-27791

Photon-photon collisions
[DE83-007011] N83-27813

Hunt for the 1(1)P sub 1 bound state of charmonium
[DE82-009520] N83-27829

STANFORD UNIV., CALIF.

Boundary conditions for suppressing rapidly moving components in hyperbolic systems, 1
[AD-A120962] N83-27164

Boundary conditions for suppressing rapidly moving components in hyperbolic systems. 2: An example
[AD-A120963] N83-27165

Effects of core nonuniformities on the performance of MHD generators
[DE83-005426] N83-27447

Psychological and system variables in team problem solving: Experimental studies of computer-mediated participation
[AD-A124924] N83-27596

Eigenvalue problem for Hermitian matrices with time-reversal symmetry
[DE83-005629] N83-27695

STATE UNIV. OF NEW YORK, ALBANY.

Aircraft measurements of trace gases and particles near the tropopause
[NASA-CR-3691] N83-27542

STATE UNIV. OF NEW YORK, SYRACUSE.

Study to assess the importance of errors introduced by applying NOAA 6 and NOAA 7 AVHRR data as an estimator of vegetative vigor: Feasibility study of data normalization
[E83-10346] N83-27321

STUTTGART UNIV. (WEST GERMANY).

Materials and welding process development for nuclear application in the Federal Republic of Germany N83-27217

SYSTEMS CONTROL, INC., PALO ALTO, CALIF.

Operations requirements of utilities with wind-power generation
[DE83-007051] N83-27394

T

TECHNICAL RESEARCH CENTRE OF FINLAND, ESPOO.

An instrument for measuring dynamic surface tension
[VTT-140] N83-27198

An evaluation of the precracked Charpy test
[VTT-142] N83-27275

TECHNISCHE HOGESCHOOL, DELFT (NETHERLANDS).

The stress distribution round an infinite row of circular holes in an orthotropic plate
[PB83-147157] N83-27279

Aerodynamic research on Tipvane windturbines
[PB83-147413] N83-27476

TEIJIN LTD., TOKYO (JAPAN).

Transparent heat insulating coatings on a polyester film N83-27365

TENNESSEE VALLEY AUTHORITY, CHATTANOOGA.

Field experiences underscore the importance of moisture control in energy-efficient homes
[DE83-901234] N83-27064

TEXAS UNIV., AUSTIN.

Preparation, characterization, physical testing and performance of fluorocarbon membranes and separators
[NASA-CR-167880] N83-26936

THOMAS ELECTRONICS INC., WAYNE N. J.

Manufacturing Methods and Technology (MM&T) specifications for miniature cathode ray tube
[AD-A124954] N83-27131

TOKYO INST. OF TECH. (JAPAN).

Interaction of hydrogen molecular ions with thin foils. Part 1: Convoy electrons N83-27721

Interaction of hydrogen molecular ions with thin foils. Part 2: Balmer emission N83-27722

Interaction of hydrogen molecular ions with thin foils. Part 3: Inner-shell ionization N83-27723

TOKYO UNIV. (JAPAN).

Inner-shell ionization and stopping power N83-27704

Stopping power of rare gases in amorphous silicon for MeV helium ions N83-27707

Measurement of model inter-digital H type linac N83-27786
An RFQ linac for heavy ion acceleration N83-27787
New formulation of the RFQ radial matching section N83-27789
Buncher section optimization of heavy ion RFQ linacs N83-27790

TRW, INC., LAWNDALE, CALIF.
Data base for hydraulically stimulated gas wells producing from tight sands formations
[DE82-013029] N83-27332

TRW SPACE TECHNOLOGY LABS., REDONDO BEACH, CALIF.
Satellite systems requirements for land mobile communications N83-26856

TUFTS UNIV., MEDFORD, MASS.
Low-cost, sprayed CdTe solar-cell research
[DE83-007275] N83-27392
High-energy physics at Tufts University
[DE83-007503] N83-27840

U

UNITED KINGDOM ATOMIC ENERGY AUTHORITY, HARWELL (ENGLAND).
Effects of ageing on the ductile-fracture mechanism in a high-strength low-alloy steel (300M)
[AERE-R-10763] N83-27015
Ultrasonic wave attenuation spectra in steels
[AERE-R-10753] N83-27808

UNITED KINGDOM ATOMIC ENERGY AUTHORITY, RISLEY (ENGLAND).
Measurement of the carbon activity of sodium with foils consisting of Fe-20Mn and stainless steel types A304L and 316L
[BLL-RISLEY-TRANS-4719(9091.9F)] N83-26989
Kinetics of hydrogen-induced stress corrosion cracking. Part 1: Important features of cracking with regard to high strength steels
[BLL-RISLEY-TRANS-4701(9091.9F)] N83-26990

UNITED TECHNOLOGIES CORP., STRATFORD, CONN.
Experimental study of main rotor/tail rotor/airframe interactions in hover. Volume 1: Text and figures
[NASA-CR-166485] N83-26820

UNIVERSITY COLL., CARDIFF (WALES).
The extinction of starlight at wavelengths near 2200A. The 2.8 to 3.6 micron spectra of micro-organisms with varying H2O-ice content
[PREPRINT-85] N83-27940
The extinction of starlight at wavelengths near 2200A N83-27941
The 2.8 to 3.6 micron spectra of micro-organisms with varying H2O-ice content N83-27942
Interstellar proteins and the discovery of a new interstellar absorption feature at lambda = 2800A
[PREPRINT-86] N83-27944

UNIVERSITY OF NORTHERN IOWA, CEDAR FALLS.
Lie algebras and flexible lie-admissible algebras. Hadronic press monographs in mathematics number 1
[DE83-007252] N83-27694

UNIVERSITY OF SOUTHEASTERN MASSACHUSETTS, NORTH DARTMOUTH.
Overview of worldwide geothermal power development N83-27379

UNIVERSITY OF SOUTHERN CALIFORNIA, LOS ANGELES.
Research on wall turbulence
[AD-A124831] N83-27153

UNIVERSITY OF SOUTHERN CALIFORNIA, MARINA DEL REY.
Place of HgI2 energy-dispersive X-ray detectors
[DE82-017651] N83-27193
NIGEL: A systemic grammar for text generation
[AD-A125253] N83-27622

UPPSALA UNIV. (SWEDEN).
Optical properties of transparent heat mirrors based on thin films of TiN, ZrN, and HfN N83-27361

UTAH UNIV., SALT LAKE CITY.
Detection of aspen/conifer forest mixes from multitemporal LANDSAT digital data
[E83-10324] N83-27309

V

VANDERBILT UNIV., NASHVILLE, TENN.
The role of convergence in stereoscopic depth constancy
[AD-A124231] N83-27590

VARIAN ASSOCIATES, PALO ALTO, CALIF.
Variable energy standing wave linear accelerator structure N83-27765

VARTA BATTERIE A.G., KELKHEIM (WEST GERMANY).
Cost/design study and fabrication/testing of a 300-W gas-recombination device for utility lead-acid cells
[DE82-019800] N83-27488

VBB/SWECO, STOCKHOLM (SWEDEN).
Satellite monitoring of vegetation and geology in semi-arid environments
[E83-10343] N83-27318

VERMONT UNIV., BURLINGTON.
Geology and mineral resources of the Lake Champlain 1 deg by 2 deg NTMS quadrangle, New Hampshire-New York-Vermont N83-27330

VETERANS ADMINISTRATION HOSPITAL, LOMA LINDA, CALIF.
Biological effects of radio-frequency radiation N83-27105

VETTER RESEARCH, COSTA MESA, CALIF.
Radiolabelling of chemicals
[DE82-017576] N83-26949

VIGYAN RESEARCH ASSOCIATES, INC., HAMPTON, VA.
Flat-plate drag measurements with vortex generators in turbulent boundary layer
[NASA-CR-172125] N83-26814

VIRGINIA COMMONWEALTH UNIV., RICHMOND.
New catalysts for the indirect liquefaction of coal
[DE82-017190] N83-26971

VIRGINIA POLYTECHNIC INST. AND STATE UNIV., BLACKSBURG.
Thermo-mechanical and thermal behavior of high-temperature structural materials
[AD-A125242] N83-27026
Injection, atomization, ignition and combustion of liquid fuels in high-speed air streams
[AD-A125237] N83-27033
A study of the stress wave factor technique for the characterization of composite materials
[NASA-CR-3670] N83-27248
Bending of laminated anisotropic shells by a shear deformable finite element
[PB83-145409] N83-27278

VIRGINIA UNIV., CHARLOTTESVILLE.
Design of an electron beam spectral modification system N83-27779

W

WASEDA UNIV., TOKYO (JAPAN).
Stopping power of Ni, Ag, Au and Pb for approximately 7 MeV/n alpha-particles and carbon ions (Z 3/1 proportional deviation from the Bethe formula) N83-27702
Estimation of fluctuation in restricted energy loss N83-27712
Calculation of the equilibrium mean charge of helium ions N83-27717

WASHINGTON UNIV., SEATTLE.
Effects of non-constant enthalpy addition on fan-nozzle combinations N83-26807
Subtle consequences of exposure to weak microwave fields: Are there non-thermal effects?
[AD-A125169] N83-27090
Summer decay and retreat of a sea ice cover
[AD-A125124] N83-27560
Use of analytical mechanics in defining acoustic-test methodology
[DE82-018615] N83-27802

WATKINS-JOHNSON CO., SCOTTS VALLEY, CALIF.
Optical coatings by conveyorized atmospheric Chemical Vapor Deposition (CVD) N83-27368

WEAPONS SYSTEMS RESEARCH LAB., ADELAIDE (AUSTRALIA).
The use of the Blake computer program to calculate thermodynamic properties of Australian-made gun propellants
[AD-A118605] N83-27615

WEATHER SQUADRON (7TH), NEW YORK, N.Y. DETACHMENT 3.
Terminal forecast reference notebook for Grafenwoehr AAF, Germany
[AD-A125038] N83-27549

WEATHER SQUADRON (7TH), NEW YORK, N.Y. DETACHMENT 7.
Terminal forecast reference notebook for Heidelberg AB, Germany
[AD-A125037] N83-27550

WEATHER SQUADRON (31ST), APO NEW YORK, N.Y. DETACHMENT 25.
Terminal forecast reference notebook for Rhein Main AB, Germany
[AD-A124984] N83-27547

WELDING INST., CAMBRIDGE (ENGLAND).
Welding technology for energy conversion N83-27216

WEST VIRGINIA UNIV., MORGANTOWN.
Deposition of aerosols in sampling tubes
[DE82-017311] N83-27062
Literature review of sampling probes. Phase 5: Probe inlet design
[DE82-017327] N83-27505

WESTINGHOUSE ELECTRIC CORP., PITTSBURGH, PA.
Effects of hydrazine and pH on the corrosion of copper-alloy materials in AVT environments with oxygen
[DE83-901124] N83-27004
Optimized two-capacity advanced electric heat pump
[DE82-017447] N83-27173
Process research on non-CZ silicon material
[NASA-CR-172684] N83-27381

WESTINGHOUSE ELECTRIC CORP., TAMPA, FLA.
Welding equipment and process development for inaccessible tube-to-tubesheet welding on a sodium-heated steam generator N83-27236

WESTINGHOUSE RESEARCH AND DEVELOPMENT CENTER, PITTSBURGH, PA.
Large-area sheet task: Advanced dendritic-eb-growth development
[NASA-CR-172683] N83-27353
Development of copper sulfide/cadmium thin-film solar cells
[DE82-014308] N83-27416

WISCONSIN UNIV., MADISON.
A calculation of wrinkled flames
[AD-A125258] N83-26943
On the quantitative analysis of liquid flow in physiological tubes
[AD-A125284] N83-27155
Linearized stability of extreme shock profiles for systems of conservation laws with viscosity
[AD-A125256] N83-27159
On steady vortex flow in two dimensions, 1
[AD-A120965] N83-27162
On steady vortex flow in two dimensions, 2
[AD-A120966] N83-27163
Boundary conditions for suppressing rapidly moving components in hyperbolic systems, 1
[AD-A120962] N83-27164
Boundary conditions for suppressing rapidly moving components in hyperbolic systems. 2: An example
[AD-A120963] N83-27165
Thermoelastic response to a short laser pulse
[AD-A125247] N83-27203
An asymptotically orthonormal polynomial family
[AD-A125268] N83-27644
Some remarks on the continuation method of Leray-Schauder-Rabinowitz and the method of monotone iterations
[AD-A125267] N83-27645
Lax-Wendroff methods for hyperbolic history value problems
[AD-A125283] N83-27649
A class of biharmonic end-striping problems arising in elasticity and Stokes flow
[AD-A125305] N83-27653
Large amplitude time periodic solutions of a semilinear wave equation
[AD-A125257] N83-27654
Differentiation and generation of Taylor coefficients in PASCAL-SC
[AD-A125246] N83-27655
Linear parabolic equations with a singular lower order coefficient
[AD-A125245] N83-27656
Local structure of feasible sets in nonlinear programming. Part 1: Regularity
[AD-A125244] N83-27657
Conditional permutation tests and the propensity score in observational studies
[AD-A125241] N83-27658
The stability of one-step schemes for first-order two-point boundary value problems
[AD-A125240] N83-27659
On the numerical solution of some 2-D electromagnetic interface problems by the boundary collocation method
[AD-A125269] N83-27666
Sensitivity of Bayes inference with ignorable but data-dependent stopping rules
[AD-A125306] N83-27685
Shear Alfven waves in Tokamaks
[DE83-007194] N83-27872

WOODS HOLE OCEANOGRAPHIC INSTITUTION, MASS.
Long term upper ocean study (LOTUS): A summary of the historical data and engineering test data
[AD-A124362] N83-27559
A compilation of moored instrument data and associated oceanographic observations. Volume 30: Gulf Stream extension and Norwegian Sea overlow intrusion experiments, 1979 - 1980
[AD-A124618] N83-27562

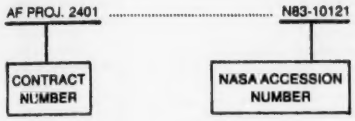
WRIGHT STATE UNIV., DAYTON, OHIO.
Some advantages of unsteady aerodynamics
N83-26808

Y

YALE UNIV., NEW HAVEN, CONN.
Simultaneous multipoint measurements of density gradients and temperature in a flame
[DE83-007291] N83-26975
Deactivation and regeneration of hydrogenolysis activity over Rh-Ag bimetallic catalysts supported on TiO2
[DE82-011240] N83-27449

CONTRACT NUMBER INDEX

Typical Contract Number Index Listing



Listings in this index are arranged alphanumerically by contract number. Under each contract number the NASA accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order. The NASA accession number denotes the number by which the citation is identified.

AF PROJ. 431G N83-27544
AF PROJ. 1900 ..... N83-27035
AF PROJ. 2301 ..... N83-27185
N83-27582
N83-27858
AF PROJ. 2304 ..... N83-27642
N83-27650
N83-27652
AF PROJ. 2306 ..... N83-27156
AF PROJ. 2307 ..... N83-26929
N83-27154
N83-27161
N83-27201
N83-27262
AF PROJ. 2308 ..... N83-27033
N83-27895
AF PROJ. 2312 ..... N83-27582
N83-27583
AF PROJ. 2338 ..... N83-27102
AF PROJ. 2402 ..... N83-26832
AF PROJ. 7930 ..... N83-27594
AF-AFOSR-ISSA-82-00012 ..... N83-27895
AF-AFOSR-0039-80 ..... N83-27583
AF-AFOSR-0045-81 ..... N83-27161
AF-AFOSR-0065-81 ..... N83-27582
AF-AFOSR-0121-79 ..... N83-27858
AF-AFOSR-0122-81 ..... N83-27652
AF-AFOSR-0142-81 ..... N83-27278
AF-AFOSR-0169-80 ..... N83-27642
AF-AFOSR-0227-81 ..... N83-27262
AF-AFOSR-2954E-76 ..... N83-26792
AF-AFOSR-3485-78 ..... N83-27033
AF-AFOSR-3525-78 ..... N83-26808
AF-AFOSR-3640-78 ..... N83-26929
ARPA ORDER 3597 ..... N83-27094
N83-27130
N83-27600
N83-27643
ARPA ORDER 3718 ..... N83-27843
ARPA ORDER 3958 ..... N83-27621
ARPA ORDER 4042 ..... N83-27103
ARPA ORDER 4077 ..... N83-27156
ARPA ORDER 4395 ..... N83-27842
DA PROJ. 1L1-61102-AH-47 ..... N83-26942
DA PROJ. 1L1-62120-AB-25 ..... N83-27091
DA PROJ. 1L1-62618-AH-80 ..... N83-26938
DA PROJ. 1L1-62706-A-553 ..... N83-27261
DA PROJ. 1L1-62720-D-048 ..... N83-27480
DA PROJ. 1T1-61102-BH-5701 ..... N83-27847
DA PROJ. 3E1-62777-A-878 ..... N83-27581
N83-27586
DA-ARO-D-31-124-73-G118 ..... N83-27153
DAAG29-C-0137 ..... N83-27153
DAAG29-76-G-0294 ..... N83-27696
DAAG29-76-G-0297 ..... N83-27153
DAAG29-79-C-0161 ..... N83-27696
DAAG29-80-C-0041 ..... N83-26943
N83-27155
N83-27159
N83-27162
N83-27163
N83-27164
N83-27165
N83-27203
N83-27644
N83-27645
N83-27649
N83-27653
N83-27654
N83-27655
N83-27656
N83-27657
N83-27658
N83-27659
N83-27666
N83-27685
DAAG29-81-K-0138 ..... N83-26997
N83-26998
DAAG53-76-C-0138 ..... N83-27616
N83-27640
N83-27648
N83-27649
DAAK11-80-C-0001 ..... N83-27261
DAAK70-80-C-0090 ..... N83-27204
DAAK70-80-C-0168 ..... N83-27131
DACW39-76-C-0084 ..... N83-27479
DAJA37-80-C-0345 ..... N83-27847
DARPA ORDER 3206 ..... N83-27616
N83-27640
N83-27648
N83-27649
DE-AC01-76ET-10251 ..... N83-27899
DE-AC01-76ET-10255 ..... N83-27402
DE-AC01-76ET-10348 ..... N83-27241
N83-27246
DE-AC01-76ET-10546 ..... N83-26965
DE-AC01-77ET-10280 ..... N83-27406
DE-AC01-79CS-30027 ..... N83-27422
DE-AC01-79ET-20622 ..... N83-27472
DE-AC01-80CS-24312 ..... N83-27471
N83-27514
DE-AC01-80ER-10784 ..... N83-27388
DE-AC01-80ET-15288 ..... N83-26963
DE-AC01-80ET-15611 ..... N83-27447
DE-AC01-80ET-20647 ..... N83-27426
DE-AC01-80PE-70269 ..... N83-27350
N83-27922
DE-AC01-81ER-30011 ..... N83-27927
DE-AC02-76CH-00016 ..... N83-26951
N83-26955
N83-26981
N83-27040
N83-27405
N83-27417
N83-27507
N83-27869
DE-AC02-76CH-03000 ..... N83-27822
DE-AC02-76CH-03073 ..... N83-27866
DE-AC02-76ER-01198 ..... N83-26980
N83-27808
N83-27885
N83-27889
DE-AC02-76ER-03023 ..... N83-27840
DE-AC02-76ET-20051 ..... N83-27385
DE-AC02-76ET-20279 ..... N83-27140
N83-27397
N83-27398
N83-27399
N83-27427
N83-27437
N83-27438
DE-AC02-76ET-53051 ..... N83-27872
DE-AC02-77CH-00178 ..... N83-26968
N83-26969
N83-27054
N83-27063
N83-27168
N83-27385
N83-27386
N83-27392
N83-27413
N83-27414
N83-27415
N83-27416
N83-27431
N83-27443
N83-27451
N83-27453
N83-27526
DE-AC02-77ET-29100 ..... N83-27133
DE-AC02-78CS-54936 ..... N83-27923
DE-AC02-78ER-10107 ..... N83-27008
DE-AC02-79ER-10425 ..... N83-26973
DE-AC02-79ER-10504 ..... N83-27400
DE-AC02-79ET-15419 ..... N83-27006
DE-AC02-80CS-83004 ..... N83-27401
DE-AC02-80ER-10670 ..... N83-27002
DE-AC02-80ER-10851 ..... N83-27694
DE-AC02-81ER-10829 ..... N83-27449
DE-AC02-81ER-10914 ..... N83-27039
DE-AC02-81ER-10969 ..... N83-26975
DE-AC02-81ER-40033 ..... N83-27830
DE-AC02-82CH-10100 ..... N83-27418
DE-AC02-82CH-10122 ..... N83-27455
DE-AC03-76SF-00098 ..... N83-26943
N83-26948
N83-26949
N83-26950
N83-26954
N83-27005
N83-27007
N83-27104
N83-27132
N83-27190
N83-27268
N83-27357
N83-27464
N83-27469
N83-27571
N83-27870
DE-AC03-76SF-00515 ..... N83-27194
N83-27739
N83-27753
N83-27791
N83-27813
N83-27829
N83-27870
DE-AC03-76SF-00700 ..... N83-27452
DE-AC03-76ER-01885 ..... N83-26932
DE-AC03-76ET-13077 ..... N83-27333
DE-AC03-76ET-27146 ..... N83-26949
DE-AC03-81ER-40050 ..... N83-27829
DE-AC03-81SF-11503 ..... N83-27391
DE-AC04-76DP-00053 ..... N83-27206
N83-27826
DE-AC04-76DP-00487 ..... N83-26977
N83-27037
DE-AC04-76DP-00613 ..... N83-27003
DE-AC04-76DP-00656 ..... N83-27141
N83-27792
DE-AC04-76DP-00789 ..... N83-26917
N83-26953
N83-26956
N83-26976
N83-27043
N83-27044
N83-27060
N83-27110
N83-27134
N83-27137
N83-27138
N83-27167
N83-27169
N83-27170
N83-27171
N83-27189
N83-27195
N83-27196
N83-27197
N83-27205
N83-27242
N83-27267
N83-27389
N83-27396
N83-27407
N83-27408
N83-27409

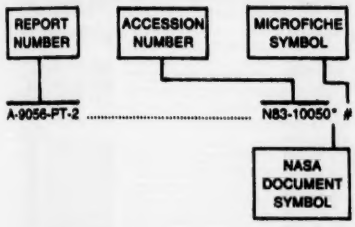
DE-AC04-76DP-03533 ..... N83-27384
N83-27461
N83-27690
DE-AC04-76DP-000789 ..... N83-27802
DE-AC04-79ET-15397 ..... N83-27247
DE-AC05-76ET-10104 ..... N83-26966
DE-AC05-76OR-00033 ..... N83-27551
DE-AC05-76OR-00033 ..... N83-27816
DE-AC05-79CS-56051 ..... N83-27036
DE-AC06-81ER-10977 ..... N83-27917
N83-27918
DE-AC06-76FF-02170 ..... N83-27000
DE-AC06-76RL-01830 ..... N83-27052
N83-27191
N83-27382
N83-27383
N83-27394
N83-27465
N83-27481
N83-27488
N83-27626
N83-27631
N83-27804
N83-27823
DE-AC06-77RL-01030 ..... N83-27188
DE-AC07-76ID-01570 ..... N83-27602
N83-27838
N83-27839
N83-27860
DE-AC07-79ID-01675 ..... N83-26952
DE-AC08-76NV-01183 ..... N83-27193
N83-27266
DE-AC08-78DP-40030 ..... N83-27206
DE-AC08-81NV-10174 ..... N83-27473
DE-AC09-76SR-00001 ..... N83-27327
DE-AC13-76GJ-01664 ..... N83-27335
DE-AC19-78BC-00042 ..... N83-27524
DE-AC21-79ET-14884 ..... N83-26964
DE-AC21-80MC-14129 ..... N83-26974
DE-AC21-80MC-14380 ..... N83-26972
DE-AC21-80MC-14384 ..... N83-26961
DE-AC21-80MC-14591 ..... N83-26959
N83-26960
DE-AC21-81MC-16361 ..... N83-27511
DE-AC21-81MC-16372 ..... N83-27337
DE-AC21-81MC-16554 ..... N83-27332
DE-AC22-76ET-10567 ..... N83-27046
DE-AC22-78ET-11423 ..... N83-26957
DE-AC22-79ET-14941 ..... N83-26967
DE-AC22-80PC-30292 ..... N83-26945
DE-AC22-80PC-30294 ..... N83-26962
DE-AC22-80PC-30296 ..... N83-26958
DE-AC22-81PC-40276 ..... N83-26970
DE-AI-01-80ET-17088 ..... N83-27348
DE-AI01-76CS-31020 ..... N83-27421
DE-AI01-77CS-51040 ..... N83-27924
N83-27410
N83-27411
N83-27412
N83-27423
N83-27424
N83-27433
N83-27434
N83-27435
N83-27439
N83-27440
N83-27441
N83-27442
N83-27446
N83-27454
N83-27458
N83-27459
N83-27460
N83-27462
N83-27463
N83-27527
N83-27528
N83-27529
N83-27530
N83-27552
N83-27555
N83-27610
N83-27611
N83-27625
N83-27626
N83-27693
N83-27803
N83-27805
N83-27814
N83-27821
N83-27825
N83-27832
N83-27863
N83-27884
N83-27886
N83-27887
DE-AI01-79ER-10060 ..... N83-27498
DE-AI01-79ET-20320 ..... N83-27347
DE-AI01-80CS-50194 ..... N83-27923
DE-AI01-80CS-80010 ..... N83-27049
N83-27050
DE-AI01-80ET-17088 ..... N83-27345
DE-AI01-82CS-50286 ..... N83-27244
N83-27245
DE-AI05-82OR-1055 ..... N83-27346
DE-AM21-79MC-11284 ..... N83-27062
N83-27505
DE-AS02-76ET-20025 ..... N83-27048
DE-AS05-76CS-35100 ..... N83-27445
DE-AS05-80ER-10655 ..... N83-27029
DE-AS05-81ER-10977 ..... N83-27916
DE-AS07-79ET-27204 ..... N83-27338
DE-AS22-78ET-00277 ..... N83-27444
DE-FC02-80CS-30586 ..... N83-27061
DE-FC07-80ID-12198 ..... N83-27425
DE-FC07-80ID-12203 ..... N83-27139
DE-FG01-82ER-54008 ..... N83-27874
DE-FG02-79R5-10109 ..... N83-27387
DE-FG02-81R5-10298 ..... N83-27457
DE-FG03-77ET-20184 ..... N83-27553
N83-27554
DE-FG22-80PC-30228 ..... N83-26971
DE-FG22-80PC-30309 ..... N83-27510
DE-FG22-80PC-30323 ..... N83-27512
DEN3-32 ..... N83-27925
DEN3-142 ..... N83-27926
DEN3-241 ..... N83-27345
N83-27348
DI-AA851-CT0-35 ..... N83-27567
DI-AA851-CT1-39 ..... N83-27568
E(40-1)-5100 ..... N83-27445
E(49-18)-2029 ..... N83-26965
EC-77-A-31-1044 ..... N83-27926
EC-77-A-31-10040 ..... N83-27925
EG-77-C-01-4042 ..... N83-26968
N83-26969
N83-27054
N83-27063
N83-27168
N83-27413
N83-27414
N83-27415
N83-27443
N83-27526
EPA-68-03-2857 ..... N83-26934
EPA-78-R-X-0337-1 ..... N83-27498
EPRI PROJ. RP-1874 ..... N83-27239
EPRI PROJ. S196-1 ..... N83-27004
EPRI PROJ. WS-82-116 ..... N83-27372
EPRI PROJ. 1039 ..... N83-27022
EPRI PROJ. 1068 ..... N83-27066
EPRI PROJ. 1348-7 ..... N83-27436
EPRI PROJ. 1438-1 ..... N83-27172
EPRI PROJ. 1520-1 ..... N83-27393
EPRI PROJ. 1745-1 ..... N83-27403
EY-76-S-02-4070 ..... N83-27048
FMV-F-FL-81713-75-038-07-001 ..... N83-26826
FMV-F-FL-82223-77-005-21-001 ..... N83-26826
FMV-F-FL-82223-78-002-21-001 ..... N83-26826
FMV-F-FL-82223-80-001-21-001 ..... N83-26826
FMV-F-FL-82223-80-183-21-001 ..... N83-26826
F047( )-81-C-0082 ..... N83-27244
N83-27245
F08635-80-C-0359 ..... N83-27035
F30602-81-C-0062 ..... N83-27102
F33615-78-C-1551 ..... N83-27094
N83-27600
F33615-78-C-1557 ..... N83-27544
F33615-79-C-3618 ..... N83-26835
F33615-81-K-1539 ..... N83-27130
N83-27643
N83-27906
F49620-79-C-0181 ..... N83-27622
F49620-80-C-0046 ..... N83-27185
F49620-81-C-0050 ..... N83-27156
F49620-82-K-0001 ..... N83-27650
HD-51442 ..... N83-27155
JPL-955843 ..... N83-27353
JPL-955909 ..... N83-27381
NAGW-8 ..... N83-27879
NAGW-95 ..... N83-27309
NAG3-223 ..... N83-27256
NAONR-18-89 ..... N83-26995
NASA ORDER C-13105-D N83-27351
N83-27352
NASA ORDER S-10757-C N83-27292
NAS1-14741 ..... N83-26831
NAS1-16028 ..... N83-26822
NAS1-16283 ..... N83-26614
NAS2-10770 ..... N83-26820
NAS2-10934 ..... N83-26849
NAS2-11161 ..... N83-26818
NAS2-19573 ..... N83-27845
NAS3-22235 ..... N83-27877
NAS3-22460 ..... N83-27213
NAS3-22668 ..... N83-27127
NAS3-22738 ..... N83-26816
NAS3-22775 ..... N83-26837
NAS3-22812 ..... N83-26928
NAS3-23252 ..... N83-27086
NAS4-2930 ..... N83-26829
NAS5-24350 ..... N83-27311
NAS5-25156 ..... N83-27795
NAS5-25300 ..... N83-27286
N83-27287
N83-27288
N83-27289
N83-27290
NAS5-26111 ..... N83-27312
NAS5-27346 ..... N83-27323
NAS5-27383 ..... N83-27322
NAS5-27384 ..... N83-27310
NAS7-100 ..... N83-26920
N83-26921
NAS8-34677 ..... N83-26919
NAS8-35042 ..... N83-26850
N83-26851
NAS9-14565 ..... N83-27284
NAS9-14689 ..... N83-27295
NAS9-15466 ..... N83-27285
NAS9-15476 ..... N83-27325
NAS9-15800 ..... N83-27300
N83-27301
N83-27302
N83-27303
N83-27304
N83-27305
N83-27306
NAS9-15981 ..... N83-27298
N83-27299
NAS9-16438 ..... N83-27297
NAS9-16457 ..... N83-27313
NAS9-16514 ..... N83-27321
NCC3-14 ..... N83-27021
NIH-N01-ES-62133 ..... N83-27090
NIH-OH-00836 ..... N83-27580
NIH-16-P-56818/0 ..... N83-27090
NR PROJ. 012-756 ..... N83-27207
NR PROJ. 083-400 ..... N83-27559
N83-27562
NR PROJ. 150-442 ..... N83-27591
NR PROJ. 157-430 ..... N83-27592
NR PROJ. 170-866 ..... N83-27596
NR PROJ. 196-158 ..... N83-27589
NR PROJ. 197-067 ..... N83-27590
NR PROJ. 307-252 ..... N83-27560
NR PROJ. 347-122 ..... N83-27686
NR PROJ. 356-655 ..... N83-27025
NR PROJ. 460-001 ..... N83-27595
NR PROJ. 041519 ..... N83-27909
NRC-A-4150 ..... N83-27179
NSF CEE-80-12337 ..... N83-27534
NSF CEE-81-07217 ..... N83-27083
NSF CEE-81-17678 ..... N83-27080
NSF CME-80-18963 ..... N83-27082
NSF DMR-79-15799 ..... N83-27891
NSF DPP-74-23654 ..... N83-27558
NSF DPP-80-04221 ..... N83-27558
NSF ECS-81-10038 ..... N83-27872
NSF ECS-82-05425 ..... N83-27671
NSF MCS-78-11985 ..... N83-27695
NSF MCS-78-25824 ..... N83-27094
NSF MCS-79-01066 ..... N83-27657
NSF MCS-79-27062 ..... N83-26943
N83-27159
N83-27164
N83-27165
N83-27656
NSF MCS-80-02927 ..... N83-27162
N83-27163
NSF MCS-81-10556 ..... N83-27654
NSF MCS-82-00632 ..... N83-27657
NSF OSS-80-16323 ..... N83-27474
N83-27475
NSF PFR-78-19333 ..... N83-27084
NSF PFR-79-08964 ..... N83-27083
NSF PFR-79-23520 ..... N83-27081
NSG-3032 ..... N83-26819
NSG-3138 ..... N83-27542
NSG-3172 ..... N83-27248
NSG-3190 ..... N83-26936
NSG-5325 ..... N83-27296
NSG-7541 ..... N83-27936
NSG-7645 ..... N83-27875
N00014-75-C-0464 ..... N83-27090
N00014-75-C-0749 ..... N83-27797
N00014-75-C-0783 ..... N83-27686
N00014-75-C-1132 ..... N83-27164

N83-27165
N00014-76-C-0197 ..... N83-27559
N83-27562
N00014-76-C-0234 ..... N83-27560
N00014-76-C-0288 ..... N83-27800
N00014-76-C-0370 ..... N83-27617
N83-27639
N83-27906
N00014-76-C-0408 ..... N83-27027
N83-27028
N00014-76-C-0613 ..... N83-27669
N83-27687
N00014-77-C-0352 ..... N83-27684
N00014-77-C-0376 ..... N83-27025
N00014-77-C-0532 ..... N83-27683
N83-27689
N83-27909
N00014-77-C-0623 ..... N83-27660
N83-27661
N00014-78-C-0147 ..... N83-27024
N00014-78-C-0325 ..... N83-26941
N00014-78-C-0375 ..... N83-27592
N00014-78-C-0425 ..... N83-27596
N00014-78-C-0431 ..... N83-27026
N00014-79-C-0340 ..... N83-27671
N00014-79-C-0658 ..... N83-27589
N00014-79-C-0709 ..... N83-27881
N00014-79-C-0982 ..... N83-27591
N00014-80-C-0408 ..... N83-27682
N00014-80-C-0481 ..... N83-27157
N00014-80-C-0650 ..... N83-27648
N00014-80-K-0709 ..... N83-27609
N83-27901
N00014-81-C-0001 ..... N83-27590
N00014-81-C-0148 ..... N83-27103
N00014-81-C-0456 ..... N83-27621
N00014-81-C-0740 ..... N83-27595
N00014-81-K-0144 ..... N83-27646
N00014-81-K-0620 ..... N83-27880
N00014-82-C-0251 ..... N83-27548
N00014-82-K-0207 ..... N83-27662
N00014-82-K-0300 ..... N83-27646
N00024-79-C-6043 ..... N83-27796
N60921-80-WR-W0168 ..... N83-27843
N62474-81-C-9395 ..... N83-27158
N62474-82-C-8276 ..... N83-27523
OETB-PROJ-3/071 ..... N83-27147
OETB-PROJ-3/690 ..... N83-27212
OETB-PROJ-580 ..... N83-27254
OETB-PROJ-252010 ..... N83-27212
PHS-P30-CA-14520 ..... N83-27658
N83-27685
PROJ. AGRISTARS N83-27285
N83-27297
N83-27298
N83-27299
N83-27300
N83-27301
N83-27302
N83-27303
N83-27304
N83-27305
N83-27306
N83-27313
N83-27317
N83-27324
N83-27325
RR0330244 ..... N83-27100
RR0420902 ..... N83-27590
SWEDCBR-C-790159-2 ..... N83-27515
N83-27532
W-31-109-ENG-38 ..... N83-26947
N83-27001
N83-27264
N83-27467
N83-27468
N83-27500
N83-27501
N83-27506
N83-27508
N83-27630
N83-27687
N83-27695
N83-27730
N83-27780
N83-27827
N83-27883
W-7405-ENG-26 ..... N83-26999
N83-27009
N83-27010
N83-27011
N83-27065
N83-27173
N83-27192
N83-27215
N83-27243
N83-27336
N83-27355
N83-27404
N83-27428
N83-27429
N83-27430
N83-27466
N83-27470
N83-27499
N83-27502
N83-27504
N83-27627
N83-27629
N83-27697
N83-27815
N83-27816
N83-27818
N83-27819
N83-27835
N83-27841
N83-27844
N83-27864
N83-27868
N83-27888
N83-27891
N83-27897
N83-27898
N83-27914
N83-27915
W-7405-ENG-36 ..... N83-26978
N83-27023
N83-27038
N83-27045
N83-27047
N83-27052
N83-27166
N83-27335
N83-27420
N83-27448
N83-27513
N83-27525
N83-27601
N83-27635
N83-27664
N83-27665
N83-27688
N83-27824
N83-27828
N83-27834
N83-27837
N83-27850
N83-27859
N83-27861
N83-27862
N83-27865
N83-27943
N83-27946
W-7405-ENG-48 ..... N83-26930
N83-26931
N83-27041
N83-27042
N83-27136
N83-27190
N83-27265
N83-27358
N83-27390
N83-27450
N83-27464
N83-27531
N83-27571
N83-27636
N83-27670
N83-27750
N83-27766
N83-27769
N83-27784
N83-27785
N83-27817
N83-27820
N83-27831
N83-27833
N83-27842
N83-27843
N83-27867
N83-27870
N83-27896
W-7405-ENG-82 ..... N83-26979
N83-27135
N83-27396
N83-27890
WF59551 ..... N83-27545
XF12141004 ..... N83-27101
XF12141350 ..... N83-27100
YF02030301 ..... N83-27523
ZF63522010 ..... N83-27593
ZF66512001 ..... N83-27900
008-71-315 ..... N83-27301
199-90-72-12-00 ..... N83-27947
505-15-83 ..... N83-26819
505-31-0 ..... N83-26817
505-31-51 ..... N83-27845
505-32-42 ..... N83-27021
N83-27214
505-33-12 ..... N83-27019
505-33-22 ..... N83-27256
505-33-33-02 ..... N83-27018
505-33-43-09 ..... N83-26815
505-33-63-01 ..... N83-27259
505-34-01 ..... N83-26846
505-34-03-06 ..... N83-26844
505-40-02 ..... N83-26838
505-42-11 ..... N83-26820
505-42-21-06-00 ..... N83-27152
505-43-22 ..... N83-26839
505-43-43-01 ..... N83-26785
505-43-43-04 ..... N83-26821
505-54-21 ..... N83-27876
506-51-11 ..... N83-27149
506-51-13-01 ..... N83-27150
N83-27151
506-52-42 ..... N83-26923
506-56-12 ..... N83-27879
506-60-42 ..... N83-26922
N83-26924
506-62-23-01 ..... N83-26853
N83-26879
512-54-14 ..... N83-26829
532-02-11 ..... N83-26845
534-03-23-05 ..... N83-27017
663-80-02 ..... N83-27293
665-10-40 ..... N83-27520
778-16-12 ..... N83-27346
506053-18 ..... N83-27020

REPORT / ACCESSION NUMBER INDEX

SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS VOLUME 21 NUMBER 16

Typical Report / Accession Number Index Listing



Listings in this index are arranged alphanumerically by report number. The NASA accession number denotes the number by which the citation is identified. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

A-8817 ..... N83-27809* #
A-8993 ..... N83-26845* #
A-8997 ..... N83-27293* #
A-9143 ..... N83-27148* #
A-9281 ..... N83-26918* #
A-9297 ..... N83-26846* #
A-9320 ..... N83-27947* #
A-9323 ..... N83-27876* #
A-9331 ..... N83-27152* #
A-9332 ..... N83-27149* #

AA-R-8122-5395 ..... N83-27534 #

AD-A116109 ..... N83-27847 #
AD-A116110 ..... N83-27557 #
AD-A118070 ..... N83-26835 #
AD-A118605 ..... N83-27615 #
AD-A120492 ..... N83-26921* #
AD-A120522 ..... N83-26920* #
AD-A120962 ..... N83-27164 #
AD-A120963 ..... N83-27165 #
AD-A120965 ..... N83-27162 #
AD-A120966 ..... N83-27163 #
AD-A121685 ..... N83-27027 #
AD-A121686 ..... N83-27028 #
AD-A122248 ..... N83-26824 #
AD-A122667 ..... N83-26787 #
AD-A122719 ..... N83-27543 #
AD-A122926 ..... N83-26929 #
AD-A123866 ..... N83-26938 #
AD-A123935 ..... N83-26925 #
AD-A123986 ..... N83-27548 #
AD-A124231 ..... N83-27590 #
AD-A124340 ..... N83-27589 #
AD-A124362 ..... N83-27559 #
AD-A124443 ..... N83-27479 #
AD-A124466 ..... N83-27592 #
AD-A124506 ..... N83-26847 #
AD-A124516 ..... N83-27558 #
AD-A124616 ..... N83-27591 #
AD-A124740 ..... N83-27570 #
AD-A124752 ..... N83-27587 #
AD-A124770 ..... N83-26830 #
AD-A124780 ..... N83-27126 #
AD-A124795 ..... N83-27096 #
AD-A124797 ..... N83-27092 #
AD-A124798 ..... N83-27091 #
AD-A124799 ..... N83-27608 #
AD-A124801 ..... N83-27129 #
AD-A124802 ..... N83-26907 #
AD-A124803 ..... N83-27593 #
AD-A124804 ..... N83-27605 #
AD-A124805 ..... N83-26852 #
AD-A124810 ..... N83-27565 #
AD-A124812 ..... N83-27848 #
AD-A124814 ..... N83-27093 #
AD-A124818 ..... N83-27562 #
AD-A124819 ..... N83-27796 #
AD-A124820 ..... N83-27634 #
AD-A124821 ..... N83-27905 #
AD-A124824 ..... N83-27618 #
AD-A124825 ..... N83-26937 #
AD-A124826 ..... N83-27032 #
AD-A124827 ..... N83-27641 #
AD-A124831 ..... N83-27153 #
AD-A124834 ..... N83-27606 #
AD-A124835 ..... N83-27680 #
AD-A124837 ..... N83-26840 #
AD-A124838 ..... N83-27640 #
AD-A124839 ..... N83-26906 #
AD-A124841 ..... N83-27678 #
AD-A124842 ..... N83-27588 #
AD-A124844 ..... N83-26914 #
AD-A124847 ..... N83-27095 #
AD-A124848 ..... N83-27616 #
AD-A124849 ..... N83-27201 #
AD-A124855 ..... N83-27607 #
AD-A124858 ..... N83-27599 #
AD-A124861 ..... N83-27102 #
AD-A124867 ..... N83-27523 #
AD-A124870 ..... N83-26833 #
AD-A124871 ..... N83-26848 #
AD-A124872 ..... N83-27623 #
AD-A124873 ..... N83-26916 #
AD-A124877 ..... N83-27637 #
AD-A124879 ..... N83-26995 #
AD-A124882 ..... N83-26828 #
AD-A124884 ..... N83-27097 #
AD-A124885 ..... N83-27907 #
AD-A124886 ..... N83-27544 #
AD-A124888 ..... N83-27797 #
AD-A124889 ..... N83-27849 #
AD-A124891 ..... N83-27908 #
AD-A124892 ..... N83-27949 #
AD-A124896 ..... N83-26825 #
AD-A124897 ..... N83-27846 #
AD-A124899 ..... N83-27681 #
AD-A124900 ..... N83-27354 #
AD-A124901 ..... N83-27620 #
AD-A124902 ..... N83-27099 #
AD-A124903 ..... N83-27098 #
AD-A124904 ..... N83-27619 #
AD-A124906 ..... N83-26940 #
AD-A124907 ..... N83-27683 #
AD-A124908 ..... N83-27911 #
AD-A124911 ..... N83-27024 #
AD-A124917 ..... N83-27682 #
AD-A124918 ..... N83-27647 #
AD-A124919 ..... N83-27910 #
AD-A124920 ..... N83-26913 #
AD-A124921 ..... N83-27909 #
AD-A124923 ..... N83-27059 #
AD-A124924 ..... N83-27596 #
AD-A124925 ..... N83-27185 #
AD-A124927 ..... N83-27912 #
AD-A124928 ..... N83-27154 #
AD-A124929 ..... N83-27025 #
AD-A124938 ..... N83-27901 #
AD-A124940 ..... N83-27684 #
AD-A124941 ..... N83-27689 #
AD-A124942 ..... N83-27100 #
AD-A124944 ..... N83-27680 #
AD-A124948 ..... N83-27798 #
AD-A124949 ..... N83-26832 #
AD-A124950 ..... N83-26994 #
AD-A124953 ..... N83-26841 #
AD-A124954 ..... N83-27131 #
AD-A124956 ..... N83-27103 #
AD-A124958 ..... N83-27609 #
AD-A124960 ..... N83-27204 #
AD-A124964 ..... N83-27686 #
AD-A124965 ..... N83-27584 #
AD-A124966 ..... N83-26834 #
AD-A124972 ..... N83-27586 #
AD-A124974 ..... N83-27801 #
AD-A124975 ..... N83-27187 #
AD-A124976 ..... N83-27585 #
AD-A124977 ..... N83-27681 #
AD-A124981 ..... N83-27671 #
AD-A124982 ..... N83-27580 #
AD-A124984 ..... N83-27547 #
AD-A124985 ..... N83-26998 #
AD-A124987 ..... N83-26841 #
AD-A124988 ..... N83-27263 #
AD-A124991 ..... N83-27682 #
AD-A124993 ..... N83-26998 #
AD-A124995 ..... N83-27161 #
AD-A125000 ..... N83-27249 #
AD-A125002 ..... N83-27662 #
AD-A125003 ..... N83-27811 #
AD-A125011 ..... N83-27545 #
AD-A125017 ..... N83-26909 #
AD-A125022 ..... N83-27695 #
AD-A125023 ..... N83-26997 #
AD-A125024 ..... N83-27858 #
AD-A125025 ..... N83-27034 #
AD-A125026 ..... N83-27669 #
AD-A125027 ..... N83-27564 #
AD-A125033 ..... N83-27687 #
AD-A125035 ..... N83-27035 #
AD-A125036 ..... N83-27624 #
AD-A125037 ..... N83-27550 #
AD-A125038 ..... N83-27549 #
AD-A125039 ..... N83-27660 #
AD-A125040 ..... N83-27661 #
AD-A125062 ..... N83-27581 #
AD-A125104 ..... N83-27561 #
AD-A125124 ..... N83-27560 #
AD-A125169 ..... N83-27090 #
AD-A125191 ..... N83-27101 #
AD-A125193 ..... N83-27900 #
AD-A125204 ..... N83-27262 #
AD-A125205 ..... N83-27582 #
AD-A125208 ..... N83-27906 #
AD-A125209 ..... N83-27617 #
AD-A125210 ..... N83-27639 #
AD-A125211 ..... N83-27643 #
AD-A125213 ..... N83-27642 #
AD-A125217 ..... N83-26939 #
AD-A125218 ..... N83-27595 #
AD-A125220 ..... N83-27563 #
AD-A125221 ..... N83-27202 #
AD-A125224 ..... N83-27094 #
AD-A125225 ..... N83-27583 #
AD-A125227 ..... N83-27894 #
AD-A125230 ..... N83-27480 #
AD-A125232 ..... N83-27651 #
AD-A125235 ..... N83-27696 #
AD-A125237 ..... N83-27033 #
AD-A125240 ..... N83-27659 #
AD-A125241 ..... N83-27658 #
AD-A125242 ..... N83-27026 #
AD-A125244 ..... N83-27657 #
AD-A125245 ..... N83-27656 #
AD-A125246 ..... N83-27655 #
AD-A125247 ..... N83-27203 #
AD-A125248 ..... N83-27186 #
AD-A125249 ..... N83-27160 #
AD-A125253 ..... N83-27622 #
AD-A125256 ..... N83-27159 #
AD-A125257 ..... N83-27654 #
AD-A125258 ..... N83-26943 #
AD-A125264 ..... N83-27158 #
AD-A125265 ..... N83-27261 #
AD-A125266 ..... N83-27260 #
AD-A125267 ..... N83-27645 #
AD-A125268 ..... N83-27644 #
AD-A125269 ..... N83-27666 #
AD-A125276 ..... N83-26942 #
AD-A125278 ..... N83-27800 #
AD-A125283 ..... N83-27649 #
AD-A125284 ..... N83-27155 #
AD-A125286 ..... N83-27799 #
AD-A125290 ..... N83-27648 #
AD-A125291 ..... N83-27621 #
AD-A125292 ..... N83-27593 #
AD-A125295 ..... N83-27157 #
AD-A125296 ..... N83-27207 #
AD-A125297 ..... N83-26915 #
AD-A125299 ..... N83-27650 #
AD-A125300 ..... N83-27156 #
AD-A125301 ..... N83-27546 #
AD-A125302 ..... N83-27597 #
AD-A125304 ..... N83-27130 #
AD-A125305 ..... N83-27653 #
AD-A125306 ..... N83-27685 #
AD-A125313 ..... N83-27652 #

AD-A125316 ..... N83-27913 #
AD-A125319 ..... N83-27594 #
AD-A125876 ..... N83-27600 #

AD-F300166 ..... N83-26938 #

AEDC-TSR-82-V15 ..... N83-26915 #

AERE-R-10753 ..... N83-27808 #
AERE-R-10783 ..... N83-27015 #
AERE-R-10802 ..... N83-27250 #
AERE-R-10803 ..... N83-26988 #
AERE-R-10806 ..... N83-27031 #
AERE-R-10815 ..... N83-27280 #
AERE-R-10832 ..... N83-27014 #

AFAPL-TR-79-2126 ..... N83-26787 #

AFESC/ESL-TR-82-38 ..... N83-27035 #

AFIT-CI-NR-82-62T ..... N83-27597 #
AFIT-CI-NR-82-63D ..... N83-27260 #
AFIT-CI-NR-82-66T ..... N83-27186 #
AFIT-CI-NR-82-71T ..... N83-27913 #
AFIT-CI-NR-82-75D ..... N83-27160 #

AFIT/DS/AA/82-1 ..... N83-26825 #

AFIT/DS/EE/82-1 ..... N83-27187 #
AFIT/DS/EE/82-2 ..... N83-27641 #

AFIT/GA/AA/82D-3 ..... N83-27893 #
AFIT/GA/AA/82D-4 ..... N83-26907 #
AFIT/GA/AA/82D-5 ..... N83-26852 #
AFIT/GA/AA/82D-8 ..... N83-27354 #
AFIT/GA/AA/82D-10 ..... N83-26913 #
AFIT/GA/AA/82D-11 ..... N83-26908 #
AFIT/GA/AA/82D-12 ..... N83-26914 #

AFIT/GAE/AA/81D-19 ..... N83-26840 #
AFIT/GAE/AA/82D-4 ..... N83-26830 #
AFIT/GAE/AA/82D-24 ..... N83-27570 #

AFIT/GAE/EE/82D-1 ..... N83-26848 #

AFIT/GCS/EE/82D-15 ..... N83-27619 #
AFIT/GCS/EE/82D-17 ..... N83-27623 #
AFIT/GCS/EE/82D-18 ..... N83-27906 #
AFIT/GCS/EE/82D-21 ..... N83-27905 #
AFIT/GCS/EE/82D-23 ..... N83-27681 #
AFIT/GCS/EE/82D-29 ..... N83-27912 #
AFIT/GCS/EE/82D-30 ..... N83-27907 #
AFIT/GCS/EE/82D-32 ..... N83-27911 #
AFIT/GCS/EE/82D-33 ..... N83-27910 #
AFIT/GCS/EE/82D-34 ..... N83-27634 #

AFIT/GCS/MA/82D-2 ..... N83-27637 #
AFIT/GCS/MA/82D-7 ..... N83-26916 #

AFIT/GE/EE/82-62 ..... N83-27098 #
AFIT/GE/EE/82D-23 ..... N83-27588 #
AFIT/GE/EE/82D-31 ..... N83-27099 #
AFIT/GE/EE/82D-32 ..... N83-27093 #
AFIT/GE/EE/82D-50 ..... N83-27097 #
AFIT/GE/EE/82D-52 ..... N83-27606 #
AFIT/GE/EE/82D-55 ..... N83-26828 #
AFIT/GE/EE/82D-60 ..... N83-27618 #

AFIT/GE/MA/82D-1 ..... N83-27620 #

AFIT/GEP-PH-82D-9 ..... N83-26937 #

AFIT/GNE/PH/83M-1 ..... N83-27647 #

AFIT/GOR-MA-82D-6 ..... N83-27680 #

AFIT/GOP-OS-820-4 ..... N83-27605 #

AFIT/GOR/MA/82D-2 ..... N83-26833 #
AFIT/GOR/MA/82D-4 ..... N83-27678 #

AFIT/GSO/EE/82D-1 ..... N83-27587 #

AFIT/GSO/MA/82D-2 ..... N83-27949 #

AFOSR-81-4TR ..... N83-27276 #
AFOSR-82-1095TR ..... N83-27642 #
AFOSR-83-0003TR ..... N83-27583 #
AFOSR-83-0006TR ..... N83-27650 #
AFOSR-83-0023TR ..... N83-27185 #
AFOSR-83-0025TR ..... N83-27033 #
AFOSR-83-0027TR ..... N83-27156 #
AFOSR-83-0031TR ..... N83-27161 #
AFOSR-83-0037TR ..... N83-27858 #
AFOSR-83-0047TR ..... N83-27895 #
AFOSR-83-0048TR ..... N83-27262 #

AFWAL-TR-81-1099 ..... N83-27544 #
AFWAL-TR-81-3171-VOL-1 ..... N83-26835 #
AFWAL-TR-82-2079 ..... N83-27154 #
AFWAL-TR-82-3043 ..... N83-26832 #
AFWAL-TR-82-3061 ..... N83-26929 #
AFWAL-TR-82-4053 ..... N83-27201 #

AGARD-BUL-83/1 ..... N83-26786 #

AIAA-83-1217 ..... N83-26922* #
AIAA-83-1389 ..... N83-26923* #

ALO-1016 ..... N83-27267 #

ANL-83-8 ..... N83-27264 #
ANL-7411-REV-SUPPL-1 ..... N83-27630 #

ANL/CEN/FE-80-10 ..... N83-27500 #

ANL/ECT-12 ..... N83-27506 #

ANL/EES-TM-205 ..... N83-27508 #

ANL/FE-80-10 ..... N83-27500 #
ANL/FE-80-10-ADD. ..... N83-27501 #
ANL/FE-82-5 ..... N83-26947 #

ANL/MCS-TM-2 ..... N83-27667 #
ANL/MCS-TM-3 ..... N83-27695 #

ANL/NDM-65 ..... N83-27827 #
ANL/NDM-66 ..... N83-27883 #
ANL/NDM-71 ..... N83-27001 #

ANL/OEPM-81-9 ..... N83-27467 #
ANL/OEPM-82-4 ..... N83-27468 #

AR-1 ..... N83-27621 #
AR-14 ..... N83-27560 #
AR-18 ..... N83-27351* #
AR-19 ..... N83-27352* #
AR-002-835 ..... N83-27615 #
AR-002-900-PT-10 ..... N83-26824 #

ARBRL-TR-02457 ..... N83-26938 #

ARCSL-CR-82020 ..... N83-27261 #

ARL-AERO-TECH-MEMO-341-PT-10 ..... N83-26824 #

ARL/PSU-TM-82-137 ..... N83-27796 #

ARO-11170.4-EG ..... N83-27153 #
ARO-13681.7-EG ..... N83-27153 #
ARO-13915.32-MA ..... N83-27696 #
ARO-16835.59-MA ..... N83-27696 #
ARO-17741.1-EG ..... N83-26998 #
ARO-17741.2-EG ..... N83-26997 #

ATMOS/82/11 ..... N83-27478 #

ATR-1 ..... N83-27355 #

AVRADCOM-TR-83-B-3 ..... N83-27018* #

B-210716 ..... N83-27604 #

BACKGROUND-PAPER-2 ..... N83-27057 #

BDX-613-2893 ..... N83-27003 #

BLL-CTO-2116-(9091.9F) ..... N83-27852 #
BLL-CTO-2117-(9091.9F) ..... N83-27851 #

BLL-DRIC-T-6775-(3623.66) N83-27251

BLL-M-26906-(5828.4) ..... N83-26991 #
BLL-M-26914-(5828.4) ..... N83-26992 #

BLL-RISLEY-TRANS-4701(9091.9F) ..... N83-26990 #
BLL-RISLEY-TRANS-4719(9091.9F) ..... N83-26989 #

BLL-T5991/BG/MRA14684/82 ..... N83-26935 #

BLM/YL/ES-82/06 ..... N83-27567 #
BLM/YL/ES-82/07 ..... N83-27568 #

BMI-2092 ..... N83-26967 #

BN-992-PT-1 ..... N83-27660 #
BN-993-PT-2 ..... N83-27661 #

BNL-31009 ..... N83-27040 #
BNL-31010 ..... N83-26981 #
BNL-31271 ..... N83-26951 #
BNL-31535 ..... N83-27417 #

BNL-31537 ..... N83-26955 #
BNL-51524 ..... N83-27869 #
BNL-51554 ..... N83-27405 #
BNL-51605 ..... N83-27507 #

BR86349 ..... N83-27251

BULL-Y-171 ..... N83-27050 #

CALSPAN-8645-F-8-VOL-1 ..... N83-26835 #

CALT-68-899 ..... N83-27829 #

CERC-CETA-82-7 ..... N83-27561 #

CFD/82/4-REV ..... N83-27180 #
CFD/82/14 ..... N83-27181 #
CFD/82/15 ..... N83-27182 #
CFD/82/18 ..... N83-26986 #

CMU-CS-82-134 ..... N83-27617 #
CMU-CS-82-144 ..... N83-27094 #
CMU-CS-82-145 ..... N83-27643 #
CMU-CS-82-146 ..... N83-27639 #
CMU-CS-82-147 ..... N83-27130 #
CMU-CS-82-150 ..... N83-27600 #
CMU-CS-82-151 ..... N83-27906 #

CONF-82012-5 ..... N83-27402 #
CONF-82043-1 ..... N83-27899 #
CONF-82058-3 ..... N83-27946* #
CONF-82075-1 ..... N83-27823 #
CONF-810281-1 ..... N83-27870 #
CONF-811145-11 ..... N83-27000 #
CONF-820131 ..... N83-27697 #
CONF-820143-1 ..... N83-27829 #
CONF-820252-1 ..... N83-27896 #
CONF-820324-2 ..... N83-27401 #
CONF-820324-4 ..... N83-27054 #
CONF-820325-6 ..... N83-26981 #
CONF-820325-9 ..... N83-27806 #
CONF-820325-12 ..... N83-26979 #
CONF-820357-4 ..... N83-27828 #
CONF-820379-1 ..... N83-27396 #
CONF-820410-7 ..... N83-27399 #
CONF-820418-21 ..... N83-27499 #
CONF-820424-29 ..... N83-27839 #
CONF-820424-30 ..... N83-27838 #
CONF-820428-7 ..... N83-27816 #
CONF-820428-9 ..... N83-27817 #
CONF-820435-1 ..... N83-27206 #
CONF-820445-1 ..... N83-27054 #
CONF-820457-2 ..... N83-27194 #
CONF-820473-2 ..... N83-27791 #
CONF-820515-1 ..... N83-27826 #
CONF-820519-VOL-1 ..... N83-26944 #
CONF-820519-VOL-3 ..... N83-26982 #
CONF-820519-VOL-4 ..... N83-26983 #
CONF-820525-1 ..... N83-27138 #
CONF-820536-2 ..... N83-27820 #
CONF-820541-1 ..... N83-27054 #
CONF-820544 ..... N83-27215 #
CONF-820545-13 ..... N83-27868 #
CONF-820546-7 ..... N83-27891 #
CONF-820548-4 ..... N83-27884 #
CONF-820563-7 ..... N83-27804 #
CONF-820581-1 ..... N83-27243 #
CONF-820588-2 ..... N83-27815 #
CONF-820598-1 ..... N83-27023 #
CONF-820599-1 ..... N83-27430 #
CONF-820601-13 ..... N83-27011 #
CONF-820601-23 ..... N83-27010 #
CONF-820605-17 ..... N83-27040 #
CONF-820605-19 ..... N83-27428 #
CONF-820606-4 ..... N83-27915 #
CONF-820612-3 ..... N83-27170 #
CONF-820616-2 ..... N83-27914 #
CONF-820618-6 ..... N83-27862 #
CONF-820627-11 ..... N83-27504 #
CONF-820628-6 ..... N83-27009 #
CONF-820629-7 ..... N83-27435 #
CONF-820644-2 ..... N83-27661 #
CONF-820644-3 ..... N83-27665 #
CONF-820644-4 ..... N83-27659 #
CONF-820654-2 ..... N83-27818 #
CONF-820655-7 ..... N83-27628 #
CONF-820656-2 ..... N83-27668 #
CONF-820657-2 ..... N83-26955 #
CONF-820663-2 ..... N83-27819 #
CONF-820664-3 ..... N83-27065 #
CONF-820664-4 ..... N83-27466 #
CONF-820664-5 ..... N83-27173 #
CONF-820667-3 ..... N83-27266 #
CONF-820667-6 ..... N83-27193 #
CONF-820670-1 ..... N83-27831 #
CONF-820676-1 ..... N83-27429 #

CONF-820676-2 ..... N83-27414 #
CONF-820697-1 ..... N83-26950 #
CONF-820697-2 ..... N83-27665 #
CONF-820698-1 ..... N83-27135 #
CONF-820708-6 ..... N83-27610 #
CONF-820710-9 ..... N83-27043 #
CONF-820712-2 ..... N83-27389 #
CONF-820713-10 ..... N83-27552 #
CONF-820718-4 ..... N83-27830 #
CONF-820718-29 ..... N83-27813 #
CONF-820727-4 ..... N83-27192 #
CONF-820803-11 ..... N83-27188 #
CONF-820807-2 ..... N83-27415 #
CONF-820809-3 ..... N83-27045 #
CONF-820810-5 ..... N83-26978 #
CONF-820811-1 ..... N83-26956 #
CONF-820814-11 ..... N83-26951 #
CONF-820815-1 ..... N83-27664 #
CONF-820819-5 ..... N83-27419 #
CONF-820819-6 ..... N83-27420 #
CONF-820819-14 ..... N83-27417 #
CONF-820822-1 ..... N83-27189 #
CONF-820822-3 ..... N83-27850 #
CONF-820878-5 ..... N83-27690 #
CONF-820902-1 ..... N83-27635 #
CONF-820905-1 ..... N83-27110 #
CONF-820905-2 ..... N83-27060 #
CONF-820906-1 ..... N83-27433 #
CONF-820907-2 ..... N83-27462 #
CONF-820908-1 ..... N83-27693 #
CONF-820908-2 ..... N83-27134 #
CONF-820920-2 ..... N83-27242 #
CONF-820920-3 ..... N83-27611 #
CONF-820921-2 ..... N83-27571 #
CONF-820926-2 ..... N83-27171 #
CONF-820927-5 ..... N83-27529 #
CONF-820929-1 ..... N83-27834 #
CONF-820930-3 ..... N83-27863 #
CONF-820970 ..... N83-27551 #
CONF-820980-4 ..... N83-27822 #
CONF-820984-2 ..... N83-27918 #
CONF-821015-5 ..... N83-27007 #
CONF-821035-11 ..... N83-26976 #
CONF-821105-2 ..... N83-27663 #
CONF-821106-6 ..... N83-27449 #
CONF-821108-12 ..... N83-27888 #
CONF-821131-2 ..... N83-27509 #
CONF-821225-1 ..... N83-27602 #
CONF-830107-3 ..... N83-27394 #
CONF-830108-3 ..... N83-27383 #
CONF-830123-1 ..... N83-27205 #
CONF-830123-2 ..... N83-27208 #
CONF-830124-1 ..... N83-27452 #
CONF-830128-1 ..... N83-26946 #
CONF-830301-8 ..... N83-27166 #
CONF-830311-2 ..... N83-27132 #
CONF-830314-1 ..... N83-27821 #
CONF-830320 ..... N83-27356 #
CONF-8205110-1 ..... N83-27887 #
CONF-8205112-1 ..... N83-27047 #
CONF-8205138 ..... N83-27339 #
CONF-8206101-2 ..... N83-27943 #
CONF-8206158-SUMM ..... N83-27898 #
CONF-8210116-1 ..... N83-27005 #

CONTRIB-82-555-J ..... N83-27313* #

CRREL-82-39 ..... N83-27558 #

CRSC-83-1 ..... N83-27309* #

CSC/TM-78/6088 ..... N83-27311* #

CSIR-TWISK-263 ..... N83-27614 #
CSIR-TWISK-264 ..... N83-27638 #

CSS/CI-82-15 ..... N83-27356 #

CTH-MATH-1983-1 ..... N83-27672 #
CTH-MATH-1983-2 ..... N83-27673 #
CTH-MATH-1983-3 ..... N83-27691 #
CTH-MATH-1983-4 ..... N83-27674 #
CTH-MATH-1983-5 ..... N83-27675 #

CTR-0747-82002 ..... N83-27923* #

CW-WR-76-020.104A ..... N83-27241 #
CW-WR-76-020.106A ..... N83-27246 #

DCN-82-212-011-42 ..... N83-27391 #

DELET-TR-82-11 ..... N83-26942 #

DE82-007784 ..... N83-27399 #
DE82-008158 ..... N83-27060 #
DE82-008615 ..... N83-27826 #
DE82-008652 ..... N83-27048 #
DE82-008920 ..... N83-27138 #
DE82-008924 ..... N83-27433 #
DE82-009090 ..... N83-27388 #
DE82-009520 ..... N83-27829 #
DE82-009808 ..... N83-26969 #
DE82-009830 ..... N83-27866 #
DE82-009912 ..... N83-27134 #
DE82-009988 ..... N83-27693 #
DE82-010076 ..... N83-27626 #
DE82-010412 ..... N83-27635 #
DE82-011004 ..... N83-26963 #
DE82-011240 ..... N83-27449 #
DE82-011499 ..... N83-26966 #
DE82-011568 ..... N83-27110 #
DE82-012024 ..... N83-26981 #
DE82-012148 ..... N83-26976 #
DE82-012149 ..... N83-27045 #
DE82-012334 ..... N83-27139 #
DE82-012430 ..... N83-27404 #
DE82-012586 ..... N83-27206 #
DE82-012717 ..... N83-27806 #
DE82-012720 ..... N83-27040 #
DE82-012777 ..... N83-27462 #
DE82-012879 ..... N83-27899 #
DE82-012926 ..... N83-27402 #
DE82-013001 ..... N83-26965 #
DE82-013029 ..... N83-27332 #
DE82-013265 ..... N83-27401 #
DE82-013366 ..... N83-26967 #
DE82-013396 ..... N83-27530 #
DE82-013490 ..... N83-26956 #
DE82-013532 ..... N83-27434 #
DE82-013565 ..... N83-27054 #
DE82-013573 ..... N83-27524 #
DE82-013574 ..... N83-27333 #
DE82-013640 ..... N83-27435 #
DE82-013700 ..... N83-26968 #
DE82-013749 ..... N83-27166 #
DE82-013754 ..... N83-27724 #
DE82-013774 ..... N83-27336 #
DE82-013800 ..... N83-27503 #
DE82-013824 ..... N83-26960 #
DE82-013844 ..... N83-27136 #
DE82-013889 ..... N83-27631 #
DE82-014002 ..... N83-27000 #
DE82-014077 ..... N83-27664 #
DE82-014085 ..... N83-27825 #
DE82-014268 ..... N83-27886 #
DE82-014308 ..... N83-27416 #
DE82-014333 ..... N83-27413 #
DE82-014409 ..... N83-27415 #
DE82-014822 ..... N83-26962 #
DE82-014849 ..... N83-27823 #
DE82-014906 ..... N83-26947 #
DE82-014986 ..... N83-27870 #
DE82-015214 ..... N83-26961 #
DE82-015379 ..... N83-26930 #
DE82-015388 ..... N83-27438 #
DE82-015414 ..... N83-27189 #
DE82-015415 ..... N83-27843 #
DE82-015489 ..... N83-26970 #
DE82-015612 ..... N83-26972 #
DE82-015622 ..... N83-27860 #
DE82-015653 ..... N83-27625 #
DE82-015680 ..... N83-27409 #
DE82-015694 ..... N83-27243 #
DE82-015736 ..... N83-27861 #
DE82-015751 ..... N83-27820 #
DE82-015797 ..... N83-26917 #
DE82-015802 ..... N83-27859 #
DE82-015807 ..... N83-26951 #
DE82-015819 ..... N83-27627 #
DE82-015877 ..... N83-27601 #
DE82-015878 ..... N83-27169 #
DE82-015882 ..... N83-27865 #
DE82-015887 ..... N83-27841 #
DE82-015912 ..... N83-27247 #
DE82-016063 ..... N83-27188 #
DE82-016080 ..... N83-27470 #
DE82-016086 ..... N83-27265 #
DE82-016225 ..... N83-27467 #
DE82-016330 ..... N83-27398 #
DE82-016335 ..... N83-26944 #
DE82-016336 ..... N83-26983 #
DE82-016337 ..... N83-26964 #
DE82-016351 ..... N83-26982 #
DE82-016367 ..... N83-27355 #
DE82-016376 ..... N83-26952 #
DE82-016382 ..... N83-27396 #
DE82-016393 ..... N83-27884 #
DE82-016394 ..... N83-27389 #
DE82-016412 ..... N83-26959 #
DE82-016613 ..... N83-27869 #
DE82-016622 ..... N83-27896 #
DE82-016636 ..... N83-27842 #
DE82-016692 ..... N83-27039 #
DE82-016739 ..... N83-27043 #
DE82-016788 ..... N83-27418 #
DE82-016800 ..... N83-26957 #
DE82-016932 ..... N83-27050 #
DE82-016938 ..... N83-27046 #
DE82-016973 ..... N83-27049 #
DE82-016992 ..... N83-27827 #
DE82-017020 ..... N83-27552 #
DE82-017028 ..... N83-27170 #
DE82-017049 ..... N83-27190 #
DE82-017055 ..... N83-27571 #
DE82-017128 ..... N83-27437 #
DE82-017190 ..... N83-26971 #
DE82-017214 ..... N83-26980 #
DE82-017237 ..... N83-27472 #
DE82-017252 ..... N83-27008 #
DE82-017259 ..... N83-27833 #
DE82-017265 ..... N83-27839 #
DE82-017285 ..... N83-27427 #
DE82-017311 ..... N83-27062 #
DE82-017315 ..... N83-27429 #
DE82-017327 ..... N83-27505 #
DE82-017369 ..... N83-27009 #
DE82-017389 ..... N83-27466 #
DE82-017403 ..... N83-27815 #
DE82-017406 ..... N83-27891 #
DE82-017407 ..... N83-27430 #
DE82-017408 ..... N83-27868 #
DE82-017426 ..... N83-27819 #
DE82-017433 ..... N83-27817 #
DE82-017442 ..... N83-27504 #
DE82-017445 ..... N83-27011 #
DE82-017447 ..... N83-27173 #
DE82-017480 ..... N83-27065 #
DE82-017481 ..... N83-27818 #
DE82-017491 ..... N83-27426 #
DE82-017506 ..... N83-27499 #
DE82-017525 ..... N83-27915 #
DE82-017526 ..... N83-27914 #
DE82-017528 ..... N83-27816 #
DE82-017551 ..... N83-27831 #
DE82-017576 ..... N83-26949 #
DE82-017588 ..... N83-27420 #
DE82-017611 ..... N83-27465 #
DE82-017642 ..... N83-26953 #
DE82-017644 ..... N83-27242 #
DE82-017651 ..... N83-27193 #
DE82-017673 ..... N83-27337 #
DE82-017677 ..... N83-27406 #
DE82-017689 ..... N83-27431 #
DE82-017694 ..... N83-27266 #
DE82-017779 ..... N83-27463 #
DE82-018061 ..... N83-27417 #
DE82-018078 ..... N83-27400 #
DE82-018098 ..... N83-26955 #
DE82-018134 ..... N83-27397 #
DE82-018160 ..... N83-27010 #
DE82-018167 ..... N83-27192 #
DE82-018199 ..... N83-27335 #
DE82-018224 ..... N83-27527 #
DE82-018291 ..... N83-27529 #
DE82-018294 ..... N83-27863 #
DE82-018339 ..... N83-27405 #
DE82-018346 ..... N83-27805 #
DE82-018348 ..... N83-27424 #
DE82-018357 ..... N83-27828 #
DE82-018372 ..... N83-27419 #
DE82-018373 ..... N83-27668 #
DE82-018378 ..... N83-27862 #
DE82-018390 ..... N83-27023 #
DE82-018415 ..... N83-27611 #
DE82-018420 ..... N83-26958 #
DE82-018428 ..... N83-27425 #
DE82-018531 ..... N83-26954 #
DE82-018551 ..... N83-27195 #
DE82-018553 ..... N83-27044 #
DE82-018578 ..... N83-27334 #
DE82-018582 ..... N83-26948 #
DE82-018584 ..... N83-26950 #
DE82-018590 ..... N83-27867 #
DE82-018591 ..... N83-27832 #
DE82-018607 ..... N83-27194 #
DE82-018615 ..... N83-27802 #
DE82-018656 ..... N83-27171 #
DE82-018660 ..... N83-27885 #
DE82-018890 ..... N83-27836 #
DE82-018912 ..... N83-27469 #
DE82-018914: ..... N83-27464 #
DE82-018919 ..... N83-27555 #
DE82-018925 ..... N83-27803 #
DE82-018926 ..... N83-27426 #
DE82-018967 ..... N83-27610 #
DE82-019124 ..... N83-26979 #
DE82-019151 ..... N83-27414 #
DE82-019164 ..... N83-27063 #

DE82-019187 ..... N83-27837 #
DE82-019210 ..... N83-27804 #
DE82-019212 ..... N83-27628 #
DE82-019252 ..... N83-27421 #
DE82-019303 ..... N83-27135 #
DE82-019397 ..... N83-27867 #
DE82-019463 ..... N83-27830 #
DE82-019475 ..... N83-27001 #
DE82-019476 ..... N83-27827 #
DE82-019477 ..... N83-27883 #
DE82-019489 ..... N83-27824 #
DE82-019533 ..... N83-27850 #
DE82-019535 ..... N83-27834 #
DE82-019555 ..... N83-27665 #
DE82-019574 ..... N83-27946* #
DE82-019575 ..... N83-27047 #
DE82-019788 ..... N83-27514 #
DE82-019800 ..... N83-27468 #
DE82-019880 ..... N83-27390 #
DE82-019901 ..... N83-27629 #
DE82-019903 ..... N83-27137 #
DE82-019959 ..... N83-27814 #
DE82-019962 ..... N83-27411 #
DE82-019964 ..... N83-27408 #
DE82-019965 ..... N83-27407 #
DE82-019966 ..... N83-27412 #
DE82-019967 ..... N83-27410 #
DE82-020000 ..... N83-27528 #
DE82-020001 ..... N83-27423 #
DE82-020090 ..... N83-27663 #
DE82-020142 ..... N83-27422 #
DE82-020328 ..... N83-27471 #
DE82-021238 ..... N83-27506 #
DE82-022490 ..... N83-27381* #
DE82-901865 ..... N83-27436 #
DE82-902079 ..... N83-27066 #
DE82-902199 ..... N83-27172 #
DE82-903957 ..... N83-27432 #
DE82-905467 ..... N83-27356 #
DE82-905771 ..... N83-27403 #
DE82-905778 ..... N83-27053 #
DE83-000427 ..... N83-27812 #
DE83-000993 ..... N33-27002 #
DE83-000997 ..... N83-27451 #
DE83-001550 ..... N83-27630 #
DE83-003216 ..... N83-27338 #
DE83-003746 ..... N83-27052 #
DE83-004032 ..... N83-27792 #
DE83-004101 ..... N83-26999 #
DE83-004647 ..... N83-27888 #
DE83-004859 ..... N83-27890 #
DE83-004888 ..... N83-27448 #
DE83-005003 ..... N83-27339 #
DE83-005192 ..... N83-27205 #
DE83-005289 ..... N83-27509 #
DE83-005297 ..... N83-27473 #
DE83-005352 ..... N83-27889 #
DE83-005405 ..... N83-27510 #
DE83-005422 ..... N83-27453 #
DE83-005426 ..... N83-27447 #
DE83-005462 ..... N83-26976 #
DE83-005586 ..... N83-27602 #
DE83-005590 ..... N83-27029 #
DE83-005611 ..... N83-26945 #
DE83-005629 ..... N83-27695 #
DE83-005707 ..... N83-27104 #
DE83-005754 ..... N83-27916 #
DE83-005757 ..... N83-27452 #
DE83-005815 ..... N83-27668 #
DE83-005856 ..... N83-27005 #
DE83-005867 ..... N83-27132 #
DE83-005869 ..... N83-27268 #
DE83-005895 ..... N83-27246 #
DE83-005901 ..... N83-27508 #
DE83-005946 ..... N83-27267 #
DE83-005956 ..... N83-26974 #
DE83-005970 ..... N83-27197 #
DE83-005971 ..... N83-27196 #
DE83-005980 ..... N83-27835 #
DE83-005997 ..... N83-27507 #
DE83-006003 ..... N83-26973 #
DE83-006011 ..... N83-27003 #
DE83-006013 ..... N83-27245 #
DE83-006015 ..... N83-27244 #
DE83-006023 ..... N83-27457 #
DE83-006027 ..... N83-27446 #
DE83-006065 ..... N83-27445 #
DE83-006091 ..... N83-27443 #
DE83-006115 ..... N83-27051 #
DE83-006116 ..... N83-27456 #
DE83-006190 ..... N83-26946 #
DE83-006243 ..... N83-27444 #
DE83-006276 ..... N83-27867 #
DE83-006402 ..... N83-27554 #
DE83-006403 ..... N83-27553 #
DE83-006404 ..... N83-27215 #
DE83-006431 ..... N83-27917 #
DE83-006437 ..... N83-27133 #
DE83-006445 ..... N83-27442 #
DE83-006446 ..... N83-27439 #
DE83-006447 ..... N83-27441 #
DE83-006448 ..... N83-27440 #
DE83-006495 ..... N83-27498 #
DE83-006510 ..... N83-27916 #
DE83-006641 ..... N83-27690 #
DE83-006643 ..... N83-27822 #
DE83-006695 ..... N83-27511 #
DE83-006696 ..... N83-27387 #
DE83-006700 ..... N83-27382 #
DE83-006728 ..... N83-27208 #
DE83-006774 ..... N83-27006 #
DE83-006799 ..... N83-27697 #
DE83-006808 ..... N83-27821 #
DE83-006822 ..... N83-27455 #
DE83-006835 ..... N83-27844 #
DE83-006843 ..... N83-27454 #
DE83-006845 ..... N83-27459 #
DE83-006847 ..... N83-27167 #
DE83-006914 ..... N83-27140 #
DE83-006931 ..... N83-27037 #
DE83-006965 ..... N83-27007 #
DE83-007011 ..... N83-27813 #
DE83-007014 ..... N83-27791 #
DE83-007026 ..... N83-27512 #
DE83-007042 ..... N83-27357 #
DE83-007044 ..... N83-27383 #
DE83-007051 ..... N83-27394 #
DE83-007066 ..... N83-27871 #
DE83-007091 ..... N83-27458 #
DE83-007092 ..... N83-27460 #
DE83-007094 ..... N83-26977 #
DE83-007102 ..... N83-27513 #
DE83-007103 ..... N83-27525 #
DE83-007119 ..... N83-27038 #
DE83-007169 ..... N83-27898 #
DE83-007173 ..... N83-27897 #
DE83-007181 ..... N83-27141 #
DE83-007182 ..... N83-27551 #
DE83-007194 ..... N83-27872 #
DE83-007197 ..... N83-27461 #
DE83-007202 ..... N83-27384 #
DE83-007217 ..... N83-27450 #
DE83-007218 ..... N83-26931 #
DE83-007225 ..... N83-27395 #
DE83-007227 ..... N83-27061 #
DE83-007252 ..... N83-27694 #
DE83-007253 ..... N83-27191 #
DE83-007275 ..... N83-27392 #
DE83-007291 ..... N83-26975 #
DE83-007308 ..... N83-27531* #
DE83-007311 ..... N83-27168 #
DE83-007332 ..... N83-26932 #
DE83-007342 ..... N83-27241 #
DE83-007356 ..... N83-27042 #
DE83-007379 ..... N83-27636 #
DE83-007385 ..... N83-27385 #
DE83-007405 ..... N83-27041 #
DE83-007415 ..... N83-27391 #
DE83-007428 ..... N83-27393 #
DE83-007463 ..... N83-27670 #
DE83-007472 ..... N83-27488 #
DE83-007503 ..... N83-27840 #
DE83-007586 ..... N83-27481 #
DE83-007658 ..... N83-27500 #
DE83-007659 ..... N83-27501 #
DE83-007812 ..... N83-27264 #
DE83-007883 ..... N83-27864 #
DE83-008127 ..... N83-27036 #
DE83-008132 ..... N83-27526 #
DE83-008133 ..... N83-27386 #
DE83-008313 ..... N83-27502 #
DE83-008871 ..... N83-27353* #
DE83-009825 ..... N83-27327 #
DE83-019564 ..... N83-27943 #
DE83-900154 ..... N83-27022* #
DE83-901124 ..... N83-27004 #
DE83-901135 ..... N83-27372 #
DE83-901234 ..... N83-27064 #

DOE/BC-00042/40 ..... N83-27524 #

DOE/BETC/PPS-82/5 ..... N83-27051 #

DOE/CH-10100/T2 ..... N83-27418 #
DOE/CH-10122/12 ..... N83-27455 #

DOE/CS-24312/1 ..... N83-27471 #
DOE/CS-24312/3 ..... N83-27514 #
DOE/CS-35100/T1 ..... N83-27445 #
DOE/CS-50286/2 ..... N83-27244 #
DOE/CS-50286/3 ..... N83-27245 #
DOE/CS-56051/8-VOL-2 ..... N83-27036 #
DOE/CS/30586-1 ..... N83-27061 #

DOE/EIA-0338 ..... N83-27334 #

DOE/ER-0076/1 ..... N83-27871 #
DOE/ER-0157 ..... N83-27668 #
DOE/ER-01198/1377 ..... N83-27806 #
DOE/ER-01198/1383 ..... N83-26980 #
DOE/ER-01198/1398 ..... N83-27889 #
DOE/ER-01885/5 ..... N83-26932 #
DOE/ER-03023/31 ..... N83-27840 #
DOE/ER-09982/1385 ..... N83-27885 #
DOE/ER-10060/T1 ..... N83-27498 #
DOE/ER-10107/13 ..... N83-27008 #
DOE/ER-10425/07 ..... N83-26973 #
DOE/ER-10504/1-PT-2 ..... N83-27400 #
DOE/ER-10570/T1 ..... N83-27002 #
DOE/ER-10651/T1-VOL-1 ..... N83-27694 #
DOE/ER-10655/4 ..... N83-27029 #
DOE/ER-10914/1 ..... N83-27039 #
DOE/ER-10969/2 ..... N83-26975 #
DOE/ER-10977/T2 ..... N83-27917 #
DOE/ER-10977/T3 ..... N83-27916 #
DOE/ER-40033/24 ..... N83-27830 #

DOE/ET-00277/T1 ..... N83-27444 #
DOE/ET-10104/55 ..... N83-26966 #
DOE/ET-10280/T3 ..... N83-27406 #
DOE/ET-10546/T1 ..... N83-26965 #
DOE/ET-10587/T1-PT-2 ..... N83-27046 #
DOE/ET-11423/T4 ..... N83-26957 #
DOE/ET-13077/63 ..... N83-27333 #
DOE/ET-14884/1224 ..... N83-26964 #
DOE/ET-15288/1 ..... N83-26963 #
DOE/ET-15419/T4 ..... N83-27006 #
DOE/ET-15611/T6 ..... N83-27447 #
DOE/ET-20025/11 ..... N83-27048 #
DOE/ET-20279/142 ..... N83-27438 #
DOE/ET-20279/159 ..... N83-27437 #
DOE/ET-20279/183 ..... N83-27399 #
DOE/ET-20279/190 ..... N83-27427 #
DOE/ET-20279/196 ..... N83-27398 #
DOE/ET-20279/208 ..... N83-27397 #
DOE/ET-20279/237 ..... N83-27140 #
DOE/ET-20622/1 ..... N83-27472 #
DOE/ET-20647/1 ..... N83-27426 #
DOE/ET-27146/T11 ..... N83-26949 #
DOE/ET-27204/T1-V2-APP-SECT-5 ..... N83-27338 #
DOE/ET-53051/48 ..... N83-27872 #

DOE/ID-12198/13 ..... N83-27425 #
DOE/ID-12203/T1 ..... N83-27139 #

DOE/JPL-955843-83/8 ..... N83-27353* #
DOE/JPL-955909-82/8 ..... N83-27381* #

DOE/MA-0029 ..... N83-27503 #

DOE/MC-11284/T14 ..... N83-27062 #
DOE/MC-11284/T15 ..... N83-27505 #
DOE/MC-14129/1309 ..... N83-26974 #
DOE/MC-14380/1210-VOL-1 ..... N83-26972 #
DOE/MC-14384/1200 ..... N83-26961 #
DOE/MC-14591/T2 ..... N83-26959 #
DOE/MC-14591/1173 ..... N83-26960 #
DOE/MC-16372/56 ..... N83-27337 #
DOE/MC-16554/1172 ..... N83-27332 #

DOE/METC-81-50 ..... N83-27339 #
DOE/METC-82/42-VOL-1 ..... N83-27511 #

DOE/NASA/0142-83/1 ..... N83-27926* #
DOE/NASA/0241-6 ..... N83-27345* #
DOE/NASA/1005-1 ..... N83-27346* #
DOE/NASA/20320-45 ..... N83-27347* #
DOE/NASA/51040-48 ..... N83-27924* #

DOE/NBM-202000 ..... N83-27528 #
DOE/NBM-2009090 ..... N83-27388 #
DOE/NBM-2020001 ..... N83-27423 #
DOE/NBM-3006116 ..... N83-27456 #

DOE/NV-10174/1 ..... N83-27473 #

DOE/PC-30228/T4 ..... N83-26971 #
DOE/PC-30292/8 ..... N83-26945 #
DOE/PC-30294/9 ..... N83-26962 #
DOE/PC-30298/T7 ..... N83-26958 #
DOE/PC-30309/T3 ..... N83-27510 #
DOE/PC-30323/T1 ..... N83-27512 #
DOE/PC-40276/T2 ..... N83-26970 #

DOE/R5-10109/1 ..... N83-27387 #
DOE/R5-10298/T2 ..... N83-27457 #

DOE/SF-11503/T2 ..... N83-27391 #

DPST-81-141-9 N83-27327 #

DREA-TM-82/0 N83-27798 #

DRES-340 N83-26940 #

D180-27619-1 N83-26928* #

E-1440 N83-27214* #
E-1451 N83-26839* #
E-1513 N83-27879* #
E-1564 N83-27347* #
E-1565 N83-26817* #
E-1573 N83-27021* #
E-1624 N83-27019* #
E-1636 N83-27793* #
E-1666 N83-26922* #
E-1677 N83-27020* #
E-1683 N83-27924* #
E-1684 N83-27016* #
E-1688 N83-27346* #
E-1694 N83-27794* #
E-1695 N83-26838* #
E-1707 N83-26923* #
E-1709 N83-26924* #

EG/G-82-B4569-VOL-1 N83-27568 #

EGG-M-11282 N83-27838 #
EGG-M-22082 N83-27602 #

[illegible]-PHYS-5615-ADD.2 N83-27860 #

EMRL-87 N83-26998 #
EMRL-88 N83-26997 #

ENICO-1112 N83-26952 #

ENST-D-82005 N83-27676 #

ENST-E-82012 N83-27143 #
ENST-E-82013 N83-27211 #
ENST-E-82014 N83-27114 #
ENST-E-83001 N83-27113 #

EOARD-TR-83-3 N83-27582 #

EPA-600/2-82-103 N83-26934 #

EPL-82-3/ONR-82-3 N83-27589 #

EPRI-AP-2265 N83-27436 #
EPRI-AP-2618 N83-27022* #
EPRI-AP-2760 N83-27372 #
EPRI-AP-2795 N83-27393 #

EPRI-EA-2358-VOL-2 N83-27053 #

EPRI-EM-2208 N83-27066 #
EPRI-EM-2407 N83-27403 #

EPRI-NP-2192 N83-27172 #
EPRI-NP-2654 N83-27004 #

ERC-08-82 N83-27078 #

ERIM-152400-21-F N83-27325* #
ERIM-164000-2-T N83-27323* #

ER82-4284 N83-27204 #

EW-L2-04387 N83-27303* #
EW-L3-00762 N83-27302* #

E83-10081 N83-27284* #
E83-10230 N83-27283*
E83-10273 N83-27285* #
E83-10274 N83-27286* #
E83-10285 N83-27287* #
E83-10286 N83-27288* #
E83-10287 N83-27289* #
E83-10288 N83-27290* #
E83-10292 N83-27291* #
E83-10301 N83-27292* #
E83-10302 N83-27293* #
E83-10303 N83-27294* #
E83-10305 N83-27295* #
E83-10306 N83-27296* #
E83-10307 N83-27297* #
E83-10308 N83-27298* #
E83-10309 N83-27299* #
E83-10310 N83-27300* #
E83-10311 N83-27301* #
E83-10313 N83-27302* #
E83-10314 N83-27303* #
E83-10315 N83-27304* #
E83-10316 N83-27305* #
E83-10317 N83-27306* #
E83-10319 N83-27307* #
E83-10320 N83-27308* #
E83-10324 N83-27309* #
E83-10325 N83-27310* #
E83-10327 N83-27311* #
E83-10328 N83-27312* #
E83-10329 N83-27313* #
E83-10332 N83-27314* #
E83-10333 N83-27281*
E83-10334 N83-27282*
E83-10339 N83-27315* #
E83-10341 N83-27316* #
E83-10342 N83-27317* #
E83-10343 N83-27318* #
E83-10343 N83-27320* #
E83-10344 N83-27319* #
E83-10346 N83-27321* #
E83-10347 N83-27322* #
E83-10348 N83-27323* #
E83-10349 N83-27324* #
E83-10359 N83-27325* #

FAA-CT-82-54 N83-26847 #

FE-2029-10 N83-26965 #
FE-2291-106A N83-27246 #
FE-2494-FR-2 N83-27046 #

FERMILAB-CONF-82/77-THY N83-27822 #

FFA-TN-1983-10 N83-26826 #

FOA-A-30032-E2 N83-27111 #

FOA-C-20483-D1 N83-27055 #
FOA-C-20485-D1(D4) N83-27056 #
FOA-C-30292-E1 N83-27210 #
FOA-C-30307-E1 N83-27607 #
FOA-C-30308-E1 N83-26836 #
FOA-C-30309-E N83-27556 #
FOA-C-30312-A3 N83-27142 #
FOA-C-54045-H1 N83-27598 #

FOA-C40166-C2(B2/A3) N83-26984 #

FTAS/TR-82-158 N83-27161 #

FTD-ID(RS)T-1228-82 N83-26925 #
FTD-ID(RS)T-1456-82 N83-27608 #
FTD-ID(RS)T-1546-82 N83-27095 #
FTD-ID(RS)T-1603-82 N83-27032 #
FTD-ID(RS)T-1722-82 N83-27607 #
FTD-ID(RS)T-1750-82 N83-27096 #
FTD-ID(RS)T-1777-82 N83-27129 #
FTD-ID(RS)T-1851-82 N83-27128 #

FUB-3B3182 N83-27118 #
FUB-3C3082 N83-27125 #
FUB-14-1982 N83-27115 #
FUB-15-1982 N83-27116 #
FUB-16-1982 N83-27117 #
FUB-19-1982 N83-27118 #
FUB-20-1982 N83-27119 #
FUB-21-1982 N83-27120 #
FUB-22-1982 N83-27121 #
FUB-23-1982 N83-27122 #
FUB-24-1982 N83-27123 #
FUB-31-1982 N83-27124 #
FUB-32-1982 N83-27125 #

GAO/AFMD-83-36 N83-27604 #

GEPP-TIS-657 N83-27141 #
GEPP-TIS-699 N83-27792 #

GES-10077-REV-D N83-27286* #

GITI-22 N83-27557 #

GJBX-8(83) N83-27327 #
GJBX-51(82) N83-27336 #
GJBX-136-82 N83-27335 #

GKSS-82/E/44 N83-27276 #

GPO-19-200 N83-27921 #

GRI-80/0101 N83-27079 #

GSFC-435-D-400-REV-6 N83-27291* #

GT-83-001 N83-27926* #

HDL-TR-2004 N83-27091 #

HEDL-SA-2529 N83-27000 #

HL83/146(C14) N83-27031 #
HL83/169(C14) N83-27250 #
HL83/454(C14) N83-27280 #
HL83/500(C14) N83-26988 #
HL83/806(C14) N83-27014 #

IAEA-CN-41/N-1 N83-27863 #

INPE-2564-RPE/423-VOL-1 N83-27314* #
INPE-2564-RPE/423-VOL-2 N83-27281*
INPE-2564-RPE/423-VOL-3 N83-27282*
INPE-2624-TDL/108 N83-27320* #
INPE-2644-PRE/282 N83-27319* #
INPE-2661-TDL/119 N83-27316* #
INPE-2694-TDL/128 N83-27315* #
INPE-2701-NTE/199 N83-27283*
INPE-2717-PRE/303 N83-27878 #
INPE-2722-PRE/307 N83-27088 #
INPE-2724-PRE/308 N83-27087 #
INPE-2725-PRE/309 N83-27089 #
INPE-2728-PRE/310 N83-27539 #
INPE-2729-PRE/311 N83-27540 #
INPE-2730-PRE/312 N83-27541 #
INPE-2736-PRE/316 N83-27810 #
INPE-2737-PRE/317 N83-27948 #
INPE-2740-PRE/319 N83-27521 #

IPPJ-624 N83-27856 #
IPPJ-625 N83-27855 #
IPPJ-626 N83-27853 #
IPPJ-627 N83-27854 #
IPPJ-628 N83-27857 #

IR-4 N83-27847 #

IS-M-376 N83-27396 #
IS-M-391 N83-26979 #
IS-M-396 N83-27135 #

IS-T-1047 N83-27890 #

ISBN-87-7478-185-5 N83-27566 #
ISBN-951-38-1609-5 N83-27198 #
ISBN-951-38-1651-6 N83-27275 #

ISI/RR-83-105 N83-27622 #

ISSN-0077-5606 N83-27258 #
ISSN-0077-5606 N83-27892 #
ISSN-0208-5658 N83-26993 #
ISSN-0208-5658 N83-27252
ISSN-0208-5658 N83-27613 #
ISSN-0344-9629 N83-27276 #
ISSN-0346-1199 N83-26985 #
ISSN-0347-0881 N83-26933 #
ISSN-0347-0881 N83-27012 #
ISSN-0347-0881 N83-27013 #
ISSN-0347-0881 N83-27174 #
ISSN-0347-0881 N83-27269 #
ISSN-0347-0881 N83-27340 #
ISSN-0347-0881 N83-27341 #
ISSN-0347-0881 N83-27342 #
ISSN-0347-0881 N83-27515 #
ISSN-0347-0881 N83-27532 #
ISSN-0347-0881 N83-27603 #
ISSN-0347-2809 N83-27675 #
ISSN-0348-3339 N83-27308* #
ISSN-0349-2656 N83-27112 #
ISSN-0349-3571 N83-27175 #
ISSN-0349-3571 N83-27270 #
ISSN-0349-3571 N83-27271 #
ISSN-0349-3571 N83-27274 #
ISSN-0358-5077 N83-27198 #
ISSN-0358-5077 N83-27275 #
ISSN-0436-1199 N83-27209 #

IT-L2-04381-VOL-1 N83-27306* #
IT-L2-04381-VOL-2 N83-27305* #
IT-L2-04386 N83-27304* #
IT-L3-04390 N83-27300* #

JPL-7030-4 N83-26920* #

JPRS-83601 N83-27572 #

JSC-17428 N83-27324* #
JSC-18584-VOL-1 N83-27306* #
JSC-18584-VOL-2 N83-27305* #
JSC-18588 N83-27304* #
JSC-18589 N83-27303* #
JSC-18592 N83-27300* #
JSC-18593 N83-27301* #
JSC-18599 N83-27302* #

K/UR-444 ..... N83-27336 #

KGI-PREPRINT-060 ..... N83-27112 #

KMSF-U-1190 ..... N83-27206 #

KTH-AERO-TN-62 ..... N83-26843 #

KU-SFB-80/E/219 ..... N83-27177 #
KU-SFB-80/T/220 ..... N83-27178 #

L-15525 ..... N83-26821* #
L-15532 ..... N83-27259* #
L-15614-PT-1 ..... N83-26853* #
L-15614-PT-2 ..... N83-26879* #
L-15624 ..... N83-27520* #

LA-S-482-2 ..... N83-27448 #

LA-UR-82-83 ..... N83-27635 #
LA-UR-82-858 ..... N83-26978 #
LA-UR-82-887 ..... N83-27045 #
LA-UR-82-1000 ..... N83-27664 #
LA-UR-82-1397 ..... N83-27865 #
LA-UR-82-1480 ..... N83-27861 #
LA-UR-82-1494 ..... N83-27859 #
LA-UR-82-1558 ..... N83-27862 #
LA-UR-82-1627 ..... N83-27828 #
LA-UR-82-1667 ..... N83-27419 #
LA-UR-82-1668 ..... N83-27688 #
LA-UR-82-1732 ..... N83-27420 #
LA-UR-82-1841 ..... N83-27023 #
LA-UR-82-1895 ..... N83-27047 #
LA-UR-82-1961 ..... N83-27665 #
LA-UR-82-2008 ..... N83-27943 #
LA-UR-82-2159 ..... N83-27850 #
LA-UR-82-2265 ..... N83-27834 #
LA-UR-82-19142 ..... N83-27946* #

LA-7444-SR-REV-3 ..... N83-27841 #
LA-9234-C ..... N83-27724 #
LA-9251-MS ..... N83-27166 #
LA-9266-MS ..... N83-27601 #
LA-9315-MS ..... N83-27824 #
LA-9358-C ..... N83-27812 #
LA-9479-PR ..... N83-27837 #
LA-9527-MS ..... N83-27052 #
LA-9579-MS ..... N83-27513 #
LA-9612-MS ..... N83-27038 #
LA-9625-HDR ..... N83-27525 #

LBL-PUB-3019 ..... N83-27190 #

LBL-13024 ..... N83-27784 #
LBL-13772 ..... N83-27571 #
LBL-14072 ..... N83-27896 #
LBL-14125 ..... N83-26948 #
LBL-14142 ..... N83-27132 #
LBL-14278 ..... N83-27833 #
LBL-14283 ..... N83-27820 #
LBL-14332 ..... N83-27870 #
LBL-14429 ..... N83-26954 #
LBL-14438 ..... N83-27469 #
LBL-14500 ..... N83-27464 #
LBL-14531 ..... N83-26950 #
LBL-14915 ..... N83-27268 #
LBL-14999 ..... N83-27005 #
LBL-15199 ..... N83-27104 #
LBL-15258 ..... N83-27357 #
LBL-15470 ..... N83-27007 #
LBL-15480 ..... N83-26946 #

LC-63-60099 ..... N83-27199 #
LC-83-600161 ..... N83-27200* #

LEMSCO-17285 ..... N83-27324* #
LEMSCO-17763 ..... N83-27304* #
LEMSCO-18387 ..... N83-27300* #
LEMSCO-18650-VOL-1 ..... N83-27306* #
LEMSCO-18650-VOL-231 ..... N83-27305* #
LEMSCO-18836 ..... N83-27303* #
LEMSCO-18918 ..... N83-27302* #
LEMSCO-19023 ..... N83-27301* #

LG-82-ER-0184 ..... N83-26822* #

LGC-1/1982 ..... N83-26987 #

LIDS-P-1268 ..... N83-27684 #
LIDS-P-1269 ..... N83-27683 #
LIDS-P-1270 ..... N83-27689 #

LIDS-TH-1247 ..... N83-27909 #

LMSC/D885405-SS-1633 ..... N83-27795* #

LPI-TR-83-01 ..... N83-27938* #

LR-340 ..... N83-27279 #
LR-355 ..... N83-27476 #

LT-82-132 ..... N83-26829* #

M-413 ..... N83-27846* #

MB3006495 ..... N83-27498 #

MDC-Q0784 ..... N83-27157 #

ME-TSPC-TR-82-12 ..... N83-26965 #

MERADCOM-2374 ..... N83-27480 #

MHSMP-83-03 ..... N83-27037 #
MHSMP-83-06 ..... N83-26977 #

MLM-2898 ..... N83-27826 #
MLM-3042(OP) ..... N83-27208 #

MLR-1430 ..... N83-27127* #

MPIS-14/1982 ..... N83-27209 #
MPIS-19/1982 ..... N83-26985 #

MPL-U-11/83 ..... N83-27797 #

MRC-TSR-2403 ..... N83-27164 #
MRC-TSR-2404-2 ..... N83-27165 #
MRC-TSR-2406-1 ..... N83-27162 #
MRC-TSR-2407-2 ..... N83-27163 #
MRC-TSR-2448 ..... N83-27659 #
MRC-TSR-2449 ..... N83-27653 #
MRC-TSR-2450 ..... N83-26943 #
MRC-TSR-2451 ..... N83-27203 #
MRC-TSR-2452 ..... N83-27655 #
MRC-TSR-2453 ..... N83-27656 #
MRC-TSR-2454 ..... N83-27645 #
MRC-TSR-2455 ..... N83-27685 #
MRC-TSR-2456 ..... N83-27155 #
MRC-TSR-2457 ..... N83-27159 #
MRC-TSR-2458 ..... N83-27654 #
MRC-TSR-2459-PT-1 ..... N83-27657 #
MRC-TSR-2460 ..... N83-27644 #
MRC-TSR-2461 ..... N83-27666 #
MRC-TSR-2462 ..... N83-27649 #
MRC-TSR-2463 ..... N83-27658 #

MRDC41092.35FR ..... N83-27877* #

MSRR-487 ..... N83-27671 #

MTR-81W223 ..... N83-27469 #
MTR-82W32 ..... N83-27406 #

MU-E2-04226 ..... N83-27325* #

M5/83 ..... N83-27585 #

NADC-13920-2 ..... N83-26834 #

NAS 1.15:23324 ..... N83-26817* #
NAS 1.15:82121 ..... N83-27317* #
NAS 1.15:83323 ..... N83-27347* #
NAS 1.15:83362 ..... N83-27019* #
NAS 1.15:83370 ..... N83-27793* #
NAS 1.15:83388 ..... N83-26922* #
NAS 1.15:83400 ..... N83-27020* #
NAS 1.15:83405 ..... N83-27924* #
NAS 1.15:83406 ..... N83-27016* #
NAS 1.15:83407 ..... N83-27346* #
NAS 1.15:83411 ..... N83-27794* #
NAS 1.15:83419 ..... N83-26924* #
NAS 1.15:83985 ..... N83-27536* #
NAS 1.15:83987 ..... N83-27522* #
NAS 1.15:84009 ..... N83-27307* #
NAS 1.15:84270 ..... N83-26845* #
NAS 1.15:84305 ..... N83-27148* #
NAS 1.15:84312 ..... N83-26838* #
NAS 1.15:84317 ..... N83-26923* #
NAS 1.15:84348 ..... N83-26846* #
NAS 1.15:84361 ..... N83-27947* #
NAS 1.15:84362 ..... N83-26918* #
NAS 1.15:84364 ..... N83-27149* #
NAS 1.15:84365 ..... N83-27876* #
NAS 1.15:84369 ..... N83-27152* #
NAS 1.15:84566 ..... N83-27259* #
NAS 1.15:84635 ..... N83-26844* #
NAS 1.15:84646 ..... N83-27151* #
NAS 1.15:84665 ..... N83-26785* #
NAS 1.15:84667 ..... N83-27150* #
NAS 1.15:84988 ..... N83-26910* #
NAS 1.15:85000 ..... N83-26911* #
NAS 1.15:85007 ..... N83-27537* #
NAS 1.15:85019 ..... N83-27533* #
NAS 1.15:85022 ..... N83-27326* #
NAS 1.15:85025 ..... N83-27519* #
NAS 1.15:85026 ..... N83-27518* #
NAS 1.15:85027 ..... N83-27928* #
NAS 1.15:85032 ..... N83-27538* #
NAS 1.15:85035 ..... N83-27516* #
NAS 1.15:85036 ..... N83-27517* #
NAS 1.15:85179 ..... N83-27946* #
NAS 1.15:85310 ..... N83-27291* #
NAS 1.15:85346 ..... N83-27903* #
NAS 1.15:85347 ..... N83-27324* #
NAS 1.15:85349 ..... N83-27022* #
NAS 1.15:85641 ..... N83-26815* #
NAS 1.15:85643 ..... N83-27018* #
NAS 1.15:85644 ..... N83-27017* #
NAS 1.21:464 ..... N83-27200* #
NAS 1.21:7011(246) N83-27579*
NAS 1.21:7037(157) N83-26784*
NAS 1.26:3295 ..... N83-26831* #
NAS 1.26:3655 ..... N83-26822* #
NAS 1.26:3670 ..... N83-27248* #
NAS 1.26:3671 ..... N83-26819* #
NAS 1.26:3686 ..... N83-27021* #
NAS 1.26:3691 ..... N83-27542* #
NAS 1.26:3696 ..... N83-27879* #
NAS 1.26:17037 ..... N83-27531* #
NAS 1.26:165528 ..... N83-27926* #
NAS 1.26:166467 ..... N83-26818* #
NAS 1.26:166480 ..... N83-26849* #
NAS 1.26:166483 ..... N83-27845* #
NAS 1.26:166485 ..... N83-26820* #
NAS 1.26:166824 ..... N83-27795* #
NAS 1.26:167762 ..... N83-27284* #
NAS 1.26:167835 ..... N83-27321* #
NAS 1.26:167880 ..... N83-26936* #
NAS 1.26:168021 ..... N83-27345* #
NAS 1.26:168021 ..... N83-27348* #
NAS 1.26:168023 ..... N83-26928* #
NAS 1.26:168035 ..... N83-27127* #
NAS 1.26:168042 ..... N83-27923* #
NAS 1.26:168051 ..... N83-26816* #
NAS 1.26:168074 ..... N83-27925* #
NAS 1.26:168077 ..... N83-27086* #
NAS 1.26:168099 ..... N83-27877* #
NAS 1.26:168103 ..... N83-26837* #
NAS 1.26:168154 ..... N83-27256* #
NAS 1.26:170373 ..... N83-27292* #
NAS 1.26:170374 ..... N83-27294* #
NAS 1.26:170376 ..... N83-27296* #
NAS 1.26:170380 ..... N83-27308* #
NAS 1.26:170382 ..... N83-27309* #
NAS 1.26:170383 ..... N83-27310* #
NAS 1.26:170388 ..... N83-27314* #
NAS 1.26:170389 ..... N83-27281*
NAS 1.26:170390 ..... N83-27282*
NAS 1.26:170403 ..... N83-26829* #
NAS 1.26:170510 ..... N83-27312* #
NAS 1.26:170512 ..... N83-27311* #
NAS 1.26:170519 ..... N83-27287* #
NAS 1.26:170520 ..... N83-27288* #
NAS 1.26:170521 ..... N83-27289* #
NAS 1.26:170522 ..... N83-27290* #
NAS 1.26:170544 ..... N83-27286* #
NAS 1.26:170689 ..... N83-26919* #
NAS 1.26:170786 ..... N83-26850* #
NAS 1.26:170787 ..... N83-26851* #
NAS 1.26:171624 ..... N83-27295* #
NAS 1.26:171631 ..... N83-27305* #
NAS 1.26:171632 ..... N83-27308* #
NAS 1.26:171633 ..... N83-27301* #
NAS 1.26:171635 ..... N83-27300* #
NAS 1.26:171636 ..... N83-27302* #
NAS 1.26:171637 ..... N83-27303* #
NAS 1.26:171638 ..... N83-27304* #
NAS 1.26:171642 ..... N83-27297* #
NAS 1.26:171643 ..... N83-27299* #
NAS 1.26:171644 ..... N83-27298* #
NAS 1.26:171645 ..... N83-27325* #
NAS 1.26:171659 ..... N83-27313* #
NAS 1.26:171664 ..... N83-27285* #
NAS 1.26:172125 ..... N83-26814* #
NAS 1.26:172627 ..... N83-27875* #
NAS 1.26:172631 ..... N83-27836* #
NAS 1.26:172666 ..... N83-27315* #
NAS 1.26:172667 ..... N83-27283*
NAS 1.26:172668 ..... N83-27316* #
NAS 1.26:172669 ..... N83-27318* #
NAS 1.26:172670 ..... N83-27319* #
NAS 1.26:172671 ..... N83-27320* #
NAS 1.26:172672 ..... N83-27322* #
NAS 1.26:172673 ..... N83-27323* #
NAS 1.26:172677 ..... N83-26921* #
NAS 1.26:172678 ..... N83-26920* #
NAS 1.26:172679 ..... N83-27351* #

NAS 1.26:172680 ..... N83-27352* #
NAS 1.26:172682 ..... N83-27936* #
NAS 1.26:172683 ..... N83-27353* #
NAS 1.26:172684 ..... N83-27381* #
NAS 1.26:172685 ..... N83-27904* #
NAS 1.55:2269-PT-1 ..... N83-26853* #
NAS 1.55:2269-PT-2 ..... N83-26879* #
NAS 1.55:2275 ..... N83-27939* #
NAS 1.60:120 ..... N83-26823* #
NAS 1.60:2120 ..... N83-26821* #
NAS 1.60:2137 ..... N83-27293* #
NAS 1.60:2171 ..... N83-26839* #
NAS 1.60:2173 ..... N83-27679* #
NAS 1.60:2185 ..... N83-27846* #
NAS 1.61:1090 ..... N83-27809* #
NAS 1.61:1105 ..... N83-27214* #
NAS 1.61:1106 ..... N83-27520* #
NAS 126:168124 ..... N83-27213* #

NAS-811 ..... N83-27299* #

NASA-CASE-GSC-12158-1 ..... N83-27569*
NASA-CASE-GSC-12636-1 ..... N83-27058*

NASA-CASE-LEW-13174-1 ..... N83-27144*
NASA-CASE-LEW-13246-1 ..... N83-27344*

NASA-CASE-MSC-18759-1 ..... N83-27578*
NASA-CASE-MSC-18761-1 ..... N83-27577*

NASA-CASE-NPO-15292-1 ..... N83-27184*
NASA-CASE-NPO-15358-1 ..... N83-27126*
NASA-CASE-NPO-15401-1 ..... N83-27085*

NASA-CP-2269-PT-1 ..... N83-26853* #
NASA-CP-2269-PT-2 ..... N83-26879* #
NASA-CP-2275 ..... N83-27939* #

NASA-CR-3295 ..... N83-26831* #
NASA-CR-3655 ..... N83-26822* #
NASA-CR-3670 ..... N83-27248* #
NASA-CR-3671 ..... N83-26819* #
NASA-CR-3686 ..... N83-27021* #
NASA-CR-3691 ..... N83-27542* #
NASA-CR-3696 ..... N83-27879* #
NASA-CR-165528 ..... N83-27926* #
NASA-CR-166467 ..... N83-26818* #
NASA-CR-166480 ..... N83-26849* #
NASA-CR-166483 ..... N83-27845* #
NASA-CR-166485 ..... N83-26920* #
NASA-CR-166824 ..... N83-27795* #
NASA-CR-167762 ..... N83-27284* #
NASA-CR-167835 ..... N83-27321* #
NASA-CR-167880 ..... N83-26936* #
NASA-CR-168021 ..... N83-27345* #
NASA-CR-168021 ..... N83-27348* #
NASA-CR-168023 ..... N83-26928* #
NASA-CR-168035 ..... N83-27127* #
NASA-CR-168042 ..... N83-27923* #
NASA-CR-168051 ..... N83-26816* #
NASA-CR-168074 ..... N83-27925* #
NASA-CR-168077 ..... N83-27086* #
NASA-CR-168099 ..... N83-27877* #
NASA-CR-168103 ..... N83-26837* #
NASA-CR-168124 ..... N83-27213* #
NASA-CR-168154 ..... N83-27256* #
NASA-CR-170370 ..... N83-27531* #
NASA-CR-170373 ..... N83-27292* #
NASA-CR-170374 ..... N83-27294* #
NASA-CR-170376 ..... N83-27296* #
NASA-CR-170380 ..... N83-27308* #
NASA-CR-170382 ..... N83-27309* #
NASA-CR-170383 ..... N83-27310* #
NASA-CR-170388 ..... N83-27314* #
NASA-CR-170389 ..... N83-27281*
NASA-CR-170390 ..... N83-27282*
NASA-CR-170403 ..... N83-26829* #
NASA-CR-170510 ..... N83-27312* #
NASA-CR-170512 ..... N83-27311* #
NASA-CR-170519 ..... N83-27287* #
NASA-CR-170520 ..... N83-27288* #
NASA-CR-170521 ..... N83-27289* #
NASA-CR-170522 ..... N83-27290* #
NASA-CR-170544 ..... N83-27286* #
NASA-CR-170689 ..... N83-26919* #
NASA-CR-170786 ..... N83-26850* #
NASA-CR-170787 ..... N83-26851* #
NASA-CR-171624 ..... N83-27295* #
NASA-CR-171631 ..... N83-27305* #
NASA-CR-171632 ..... N83-27306* #
NASA-CR-171633 ..... N83-27301* #
NASA-CR-171635 ..... N83-27300* #
NASA-CR-171636 ..... N83-27302* #
NASA-CR-171637 ..... N83-27303* #
NASA-CR-171638 ..... N83-27304* #
NASA-CR-171642 ..... N83-27297* #
NASA-CR-171643 ..... N83-27299* #
NASA-CR-171644 ..... N83-27298* #
NASA-CR-171645 ..... N83-27325* #
NASA-CR-171659 ..... N83-27313* #
NASA-CR-171664 ..... N83-27285* #
NASA-CR-172125 ..... N83-26814* #
NASA-CR-172627 ..... N83-27875* #
NASA-CR-172631 ..... N83-27836* #
NASA-CR-172666 ..... N83-27315* #
NASA-CR-172667 ..... N83-27283*
NASA-CR-172668 ..... N83-27316* #
NASA-CR-172669 ..... N83-27318* #
NASA-CR-172670 ..... N83-27319* #
NASA-CR-172671 ..... N83-27320* #
NASA-CR-172672 ..... N83-27322* #
NASA-CR-172673 ..... N83-27323* #
NASA-CR-172677 ..... N83-26921* #
NASA-CR-172678 ..... N83-26920* #
NASA-CR-172679 ..... N83-27351* #
NASA-CR-172680 ..... N83-27352* #
NASA-CR-172682 ..... N83-27936* #
NASA-CR-172683 ..... N83-27353* #
NASA-CR-172684 ..... N83-27381* #
NASA-CR-172685 ..... N83-27904* #

NASA-NEWS-RELEASE-83-87 ..... N83-26912* #

NASA-RP-1090 ..... N83-27809* #
NASA-RP-1105 ..... N83-27214* #
NASA-RP-1106 ..... N83-27520* #

NASA-SP-464 ..... N83-27200* #
NASA-SP-7011(246) N83-27579*
NASA-SP-7037(157) N83-26784*

NASA-TM-23324 ..... N83-26817* #
NASA-TM-82121 ..... N83-27317* #
NASA-TM-83323 ..... N83-27347* #
NASA-TM-83362 ..... N83-27019* #
NASA-TM-83370 ..... N83-27793* #
NASA-TM-83388 ..... N83-26922* #
NASA-TM-83400 ..... N83-27020* #
NASA-TM-83405 ..... N83-27924* #
NASA-TM-83406 ..... N83-27016* #
NASA-TM-83407 ..... N83-27346* #
NASA-TM-83411 ..... N83-27794* #
NASA-TM-83419 ..... N83-26924* #
NASA-TM-83985 ..... N83-27536* #
NASA-TM-83987 ..... N83-27522* #
NASA-TM-84009 ..... N83-27307* #
NASA-TM-84270 ..... N83-26845* #
NASA-TM-84305 ..... N83-27148* #
NASA-TM-84312 ..... N83-26838* #
NASA-TM-84317 ..... N83-26923* #
NASA-TM-84348 ..... N83-26846* #
NASA-TM-84361 ..... N83-27947* #
NASA-TM-84362 ..... N83-26918* #
NASA-TM-84364 ..... N83-27149* #
NASA-TM-84365 ..... N83-27876* #
NASA-TM-84369 ..... N83-27152* #
NASA-TM-84566 ..... N83-27259* #
NASA-TM-84635 ..... N83-26844* #
NASA-TM-84646 ..... N83-27151* #
NASA-TM-84665 ..... N83-26785* #
NASA-TM-84667 ..... N83-27150* #
NASA-TM-84988 ..... N83-26910* #
NASA-TM-85000 ..... N83-26911* #
NASA-TM-85007 ..... N83-27537* #
NASA-TM-85019 ..... N83-27633* #
NASA-TM-85022 ..... N83-27326* #
NASA-TM-85025 ..... N83-27519* #
NASA-TM-85026 ..... N83-27518* #
NASA-TM-85027 ..... N83-27928* #
NASA-TM-85032 ..... N83-27538* #
NASA-TM-85035 ..... N83-27516* #
NASA-TM-85036 ..... N83-27517* #
NASA-TM-85179 ..... N83-27946* #
NASA-TM-85310 ..... N83-27291* #
NASA-TM-85346 ..... N83-27903* #
NASA-TM-85347 ..... N83-27324* #
NASA-TM-85349 ..... N83-27022* #
NASA-TM-85641 ..... N83-26815* #
NASA-TM-85643 ..... N83-27018* #
NASA-TM-85644 ..... N83-27017* #

NASA-TP-120 ..... N83-26823* #
NASA-TP-2120 ..... N83-26821* #
NASA-TP-2137 ..... N83-27293* #
NASA-TP-2171 ..... N83-26839* #
NASA-TP-2173 ..... N83-27679* #
NASA-TP-2185 ..... N83-27846* #

NBS-SP-250 ..... N83-27199 #

NBSIR-83-2551 ..... N83-26995 #

NCEL-CR-83.005 ..... N83-27158 #
NCEL-CR-83.011-VOL-2 ..... N83-27523 #

NMERI-EN-12 ..... N83-27432 #

NMI-R-122 ..... N83-27145
NMI-R-124 ..... N83-27146
NMI-R-130 ..... N83-27147
NMI-R-132 ..... N83-27253
NMI-R-133 ..... N83-27254
NMI-R-137 ..... N83-27255
NMI-R-143 ..... N83-27212
NMI-R-145 ..... N83-27535

NPRDC-TR-83-7 ..... N83-27900 #
NPRDC-TR-83-11 ..... N83-27593 #

NPS63-82-006-CR ..... N83-27548 #
NPS63-82-007 ..... N83-27545 #
NPS68-82-005 ..... N83-27564 #

NRC/CNR-TT-2060 ..... N83-27258 #
NRC/CNR-TT-2061 ..... N83-27257 #
NRC/CNR-TT-2062 ..... N83-27892 #

NRL-MR-4999 ..... N83-27100 #
NRL-MR-5013 ..... N83-27202 #
NRL-MR-5030 ..... N83-26939 #
NRL-MR-5031 ..... N83-27563 #

NRL-8669 ..... N83-27101 #

NSF/CEE-82015 ..... N83-27084 #
NSF/CEE-82039 ..... N83-27080 #
NSF/CEE-82044 ..... N83-27081 #
NSF/CEE-82056 ..... N83-27082 #
NSF/CEE-82057 ..... N83-27534 #
NSF/CEE-82061 ..... N83-27083 #

NSF/OSS-82003 ..... N83-27475 #
NSF/OSS-82004 ..... N83-27474 #

NSF/PRA-82028 ..... N83-27873 #

NTSB-AAR-83-01 ..... N83-26827 #

NUREG/CR-2652 ..... N83-27601 #

NWC-TM-4605 ..... N83-27599 #

NWC-TP-6427 ..... N83-26994 #

N14-0001-83C-0001 ..... N83-27590 #

ORC-82-13 ..... N83-27652 #

ORNL/MIT-351 ..... N83-27835 #

ORNL/SUB-80/24706/1 ..... N83-27355 #
ORNL/SUB-81-1012/2 ..... N83-27897 #
ORNL/SUB-7676/3 ..... N83-27864 #
ORNL/SUB-7846/11 ..... N83-27844 #

ORNL/TM-8033 ..... N83-27404 #
ORNL/TM-8192 ..... N83-27627 #
ORNL/TM-8277 ..... N83-27470 #
ORNL/TM-8356 ..... N83-27629 #
ORNL/TM-8541 ..... N83-27898 #
ORNL/TM-8603 ..... N83-27502 #

OSD/FSTC-82/161 ..... N83-27632 #
OSD/FSTC-82/162 ..... N83-27612 #

OT-R-8175 ..... N83-27146
OT-R-8209 ..... N83-27254
OT-R-8213 ..... N83-27253
OT-R-8218 ..... N83-27255
OT-R-8240 ..... N83-27535
OT-R-8256 ..... N83-27147

OWRT-B-141-GA(1) ..... N83-27078 #

PB83-136960 ..... N83-27475 #
PB83-136978 ..... N83-27474 #
PB83-144147 ..... N83-27080 #
PB83-144519 ..... N83-27567 #
PB83-144865 ..... N83-26843 #
PB83-145318 ..... N83-27081 #
PB83-145409 ..... N83-27278 #
PB83-145482 ..... N83-27082 #
PB83-145490 ..... N83-27534 #
PB83-147157 ..... N83-27279 #
PB83-147363 ..... N83-27057 #
PB83-147413 ..... N83-27476 #
PB83-147603 ..... N83-27632 #
PB83-147744 ..... N83-27277 #

PB83-147751 N83-26934 #
PB83-149054 N83-27568 #
PB83-149195 N83-27084 #
PB83-149203 N83-27083 #
PB83-149757 N83-27874 #
PB83-150201 N83-27078 #
PB83-151662 N83-27199 #
PB83-151696 N83-27873 #
PB83-155788 N83-27612 #
PB83-161109 N83-27079 #
PB83-910401 N83-26827 #

PDE-101 N83-27037 #
PDE-205 N83-26977 #

PDRC-82-02 N83-27609 #
PDRC-82-16 N83-27901 #

PMTC-TP-000006 N83-27565 #

PNL-SA-10119 N83-27628 #
PNL-SA-10392 N83-27823 #
PNL-SA-10428 N83-27804 #
PNL-SA-10607 N83-27509 #
PNL-SA-10653 N83-27383 #
PNL-SA-10890 N83-27394 #

PNL-4236-VOL-2 N83-27631 #
PNL-4242 N83-27465 #
PNL-4587 N83-27382 #
PNL-4592 N83-27191 #
PNL-4600-PT-2 N83-27481 #
PNL-4600-PT-3 N83-27488 #

PNR-90150 N83-27067 #
PNR-90152 N83-27068 #
PNR-90153 N83-27069 #
PNR-90154 N83-27070 #
PNR-90155 N83-27030 #
PNR-90156 N83-27071 #
PNR-90157 N83-27902 #
PNR-90158 N83-27183 #
PNR-90159 N83-26842 #
PNR-90160 N83-27677 #
PNR-90161 N83-27072 #
PNR-90162 N83-27073 #
PNR-90163 N83-27074 #
PNR-90164-PT-2 N83-27075 #
PNR-90165-PT-3/4 N83-27076 #
PNR-90166 N83-27077 #

PPPL-1885 N83-27866 #

PREPRINT-85 N83-27940 #
PREPRINT-86 N83-27944 #
PREPRINT-558-PT-2 N83-27179 #

PSI-TR-325 N83-26962 #
PSI-TR-361 N83-26945 #

PSU/TURBO-82-5 N83-26819* #

PWA-5768-29 N83-26816* #

P83-10098 N83-26912* #

QPR-2 N83-27310* #

QR-2 N83-26970 #
QR-2 N83-27361* #
QR-6 N83-26962 #
QR-6 N83-27345* #
QR-6 N83-27348* #
QR-8 N83-27131 #

QSTPR-2 N83-27323* #

QTR-2 N83-26971 #

R-3 N83-27646 #

RADC-TR-82-286-VOL-4A N83-27102 #

RAND-N-1925-DOE N83-27350 #

RAND/N-1903-DOE N83-27922 #
RAND/N-1909-DOE N83-27349 #

RDA-TR-18700-003 N83-27927 #

REPT-M/63/5 N83-27343 #

REPT-2-5-ONR N83-27024 #
REPT-77 N83-27295* #
REPT-83-ASE-308-SA-3 N83-27925* #
REPT-757 N83-27945

REPT-7030-3/JPL-D-1488 N83-26921* #
REPT-761108/711129 N83-26929 #

RFP-3352 N83-27690 #
RFP-3383 N83-27384 #
RFP-3425 N83-27461 #

RHO-BW-SA-208P N83-27188 #

RI/RD83-104 N83-27213* #

RPI-MATH-136 N83-27800 #

RR-82-6 N83-27686 #

SAI-022-138LJ N83-27247 #
SAI-0002-02-005 N83-27544 #

SAM-TR-82-21 N83-27594 #

SAND-79-1623-REV N83-27167 #
SAND-80-1308 N83-27886 #
SAND-81-0538 N83-27803 #
SAND-81-2017C N83-27884 #
SAND-81-2134 N83-27527 #
SAND-81-2199 N83-27044 #
SAND-81-2247C N83-27462 #
SAND-81-2380C N83-27435 #
SAND-81-2531 N83-26917 #
SAND-81-7080/5 N83-27454 #
SAND-81-7085/16 N83-27441 #
SAND-81-7086/15 N83-27459 #
SAND-81-7086/16 N83-27442 #
SAND-81-7087/5 N83-27440 #
SAND-81-7088/12 N83-27460 #
SAND-81-7091/2 N83-27439 #
SAND-81-7100/10 N83-27407 #
SAND-81-7101/2 N83-27406 #
SAND-81-7102/6 N83-27409 #
SAND-81-7102/7 N83-27410 #
SAND-81-7103/2 N83-27411 #
SAND-81-7105/1 N83-27412 #
SAND-81-7176 N83-27434 #
SAND-82-0022C N83-27134 #
SAND-82-0039 N83-26953 #
SAND-82-0228C N83-27170 #
SAND-82-0289C N83-27863 #
SAND-82-0297C N83-27626 #
SAND-82-0489C N83-27043 #
SAND-82-0505 N83-27625 #
SAND-82-0555 N83-27137 #
SAND-82-0565 N83-27463 #
SAND-82-0604 N83-27530 #
SAND-82-0617C N83-27110 #
SAND-82-0618C N83-27060 #
SAND-82-0651C N83-27138 #
SAND-82-0722 N83-27555 #
SAND-82-0723C N83-27610 #
SAND-82-0816 N83-27197 #
SAND-82-0821 N83-27814 #
SAND-82-0829 N83-27195 #
SAND-82-0893C N83-27693 #
SAND-82-1003 N83-27805 #
SAND-82-1020C N83-27611 #
SAND-82-1058C N83-26956 #
SAND-82-1065C N83-27189 #
SAND-82-1353C N83-27663 #
SAND-82-1369C N83-27552 #
SAND-82-1381C N83-27687 #
SAND-82-1553C N83-27171 #
SAND-82-1569 N83-27446 #
SAND-82-1591C N83-27242 #
SAND-82-1638C N83-27529 #
SAND-82-1667C N83-27832 #
SAND-82-1899 N83-27196 #
SAND-82-2900C N83-27821 #
SAND-82-2986C N83-27205 #
SAND-82-7008 N83-27424 #
SAND-82-7034C N83-27433 #
SAND-82-8205 N83-27169 #
SAND-82-8223 N83-27802 #
SAND-82-8744 N83-27458 #
SAND-82-8855 N83-26976 #
SAND-82-08680 N83-27825 #
SAND-83-0018 N83-27395 #

SATPR-3 N83-27925* #

SC5178.TR4 N83-26932 #
SC5233.1FR N83-27881 #

SD-TR-82-50 N83-26921* #
SD-TR-82-58 N83-26920* #

SER-A-67 N83-27174 #
SER-A-68 N83-27340 #

SER-A-68 N83-27341 #
SER-A-71 N83-27342 #
SER-A-85 N83-27515 #
SER-A-87 N83-27532 #

SER-510112-VOL-1 N83-26820* #

SERI/PR-234-1454 N83-26969 #
SERI/PR-8001-7-T4 N83-26968 #
SERI/PR-8143-1-T8 N83-27416 #
SERI/PR-9038-1-T1 N83-27385 #

SERI/SP-200-1413 N83-27431 #

SERI/TP-211-1889 N83-27443 #
SERI/TP-213-1593 N83-27415 #
SERI/TP-235-1548R N83-27414 #
SERI/TP-235-1582 N83-27054 #
SERI/TP-252-1653 N83-27168 #

SERI/TR-215-1781 N83-27526 #
SERI/TR-253-1833-VOL-2 N83-27386 #
SERI/TR-254-1544 N83-27063 #
SERI/TR-621-1335 N83-27413 #
SERI/TR-1274-1-T1 N83-27453 #
SERI/TR-8012-1-T1 N83-27451 #
SERI/TR-8104-3-T4 N83-27392 #

SGI-R-83-083 N83-27103 #

SIO-REF-83-1 N83-27797 #

SM-G1-04086 N83-27317* #

SOLAR/1101-82/50 N83-27421 #
SOLAR/2077-82/14 N83-27422 #

SR-H1-04037 N83-27295* #

SR-J1-04157 N83-27324* #

SR-L3-04392 N83-27301* #

SR-M2-04343 N83-27313* #

SR-P1-04167 N83-27285* #

SR-X1-04033 N83-27299* #
SR-X1-04046 N83-27298* #

SR-63-04408 N83-27297* #

SSD-82-0121-1 N83-26919* #

SSL-SER-19-ISSUE-1 N83-27284* #

SSS-SR-04-01 N83-26850* #
SSS-SR-04-01 N83-26851* #

STR-82-89 N83-27080 #

SU-SLAC-PUB-2861 N83-27829 #
SU-SLAC-PUB-2938 N83-27194 #
SU-SLAC-PUB-2988 N83-27813 #
SU-SLAC-PUB-2997 N83-27791 #

SVS-10266-APP-B N83-27290* #
SVS-10266-VOL N83-27288* #
SVS-10266-VOL-1-REV-B N83-27287* #
SVS-10266/3A N83-27289* #

T-5349 N83-27939* #

TEI-A009-8 N83-27131 #

TOP-6-2-594 N83-27092 #

TPR-9 N83-27416 #

TR-EE-82-26 N83-27133 #

TR-1 N83-26998 #
TR-1 N83-27591 #
TR-1 N83-27595 #
TR-2 N83-26997 #
TR-2/82 N83-27526 #
TR-4 N83-26932 #
TR-7 N83-27025 #
TR-22-1 N83-27027 #
TR-25-4 N83-27028 #
TR-67 N83-27662 #
TR-82-25 N83-27648 #
TR-82-37 N83-27650 #
TR-106 N83-27207 #
TR-137 N83-27595 #
TR-168 N83-27669 #

TR-169 ..... N83-27687 #
TR-1132 ..... N83-27849 #
TR-1179 ..... N83-27848 #
TR-1185 ..... N83-27616 #
TR-1188 ..... N83-27640 #

TRANS-15857/TLT-00841 ..... N83-26842 #
TRANS-15858/TLT-00842 ..... N83-27677 #
TRANS-16108/TLT-00871 ..... N83-27183 #
TRANS-16283/TLT-00886 ..... N83-27077 #
TRANS-16296/TLT-00887-PT-2 ..... N83-27075 #
TRANS-16297/TLT-00888-PT-3/4 ..... N83-27076 #
TRANS-16298/TLT-00889 ..... N83-27074 #
TRANS-16299/TLT-00890 ..... N83-27073 #
TRANS-16300/TLT-00891 ..... N83-27072 #
TRANS-16324/TLT-00895 ..... N83-27902 #
TRANS-16325/TLT-00896 ..... N83-27071 #
TRANS-16372/TLT-00899 ..... N83-27030 #
TRANS-16403/TLT-00903 ..... N83-27070 #
TRANS-16404/TLT-00904 ..... N83-27069 #
TRANS-16415/TLT-00905 ..... N83-27068 #
TRANS-16456/TLT-00908 ..... N83-27067 #

TRITA-FPT-042 ..... N83-26843 #

TULEA-1981-02 ..... N83-26933 #
TULEA-1981-05-T ..... N83-27270 #
TULEA-1981-06-T ..... N83-27271 #
TULEA-1981-07 ..... N83-27174 #
TULEA-1981-08 ..... N83-27340 #
TULEA-1981-14 ..... N83-27341 #
TULEA-1981-17 ..... N83-27342 #
TULEA-1981-18 ..... N83-27269 #
TULEA-1981-66-T ..... N83-27272 #
TULEA-1982-05-T ..... N83-27273 #
TULEA-1982-09 ..... N83-27515 #
TULEA-1982-11 ..... N83-27603 #
TULEA-1982-12 ..... N83-27532 #
TULEA-1982-16-PT-1 ..... N83-27012 #
TULEA-1982-17-PT-2 ..... N83-27013 #
TULEA-1982-33-T ..... N83-27274 #
TULEA-1982-36-T ..... N83-27175 #
TULEA-1982-039-T ..... N83-27176 #

TVA/OACD-82/8 ..... N83-27050 #
TVA/OACD-82/14 ..... N83-27049 #

TVA/OP/ECR-82/98-REV ..... N83-27064 #

UCB/EERC-82/07 ..... N83-27277 #
UCB/EERC-82/10 ..... N83-27084 #
UCB/EERC-82/12 ..... N83-27083 #

UCB/RP-82/D1009 ..... N83-26999 #

UCID-19080-81 ..... N83-27265 #
UCID-19383 ..... N83-27843 #
UCID-19399 ..... N83-27842 #
UCID-19690 ..... N83-27531* #
UCID-19699 ..... N83-27041 #
UCID-19726 ..... N83-27042 #
UCID-30192 ..... N83-27670 #

UCRL-TRANS-11782 ..... N83-27867 #

UCRL-15455 ..... N83-27136 #
UCRL-52000-82-7 ..... N83-27390 #
UCRL-53264-VOL-2 ..... N83-26930 #
UCRL-53351 ..... N83-26931 #
UCRL-53361 ..... N83-27450 #
UCRL-53371 ..... N83-27636 #
UCRL-87690 ..... N83-27831 #

UHMET-82-01 ..... N83-27553 #
UHMET-82-02 ..... N83-27554 #

UIC/DQM/N82-8 ..... N83-27682 #

UPITT/LRDC/ONR/KBC-7 ..... N83-27592 #

US-PATENT-APPL-SN-173520 ..... N83-27058*
US-PATENT-APPL-SN-200634 ..... N83-27144*
US-PATENT-APPL-SN-207135 ..... N83-27184*
US-PATENT-APPL-SN-219968 ..... N83-27126*
US-PATENT-APPL-SN-233270 ..... N83-27578*
US-PATENT-APPL-SN-254688 ..... N83-27577*
US-PATENT-APPL-SN-259210 ..... N83-27085*
US-PATENT-APPL-SN-266255 ..... N83-27344*
US-PATENT-APPL-SN-888434 ..... N83-27569*

US-PATENT-CLASS-73-204 ..... N83-27577*
US-PATENT-CLASS-73-597 ..... N83-27578*
US-PATENT-CLASS-125-20 ..... N83-27058*
US-PATENT-CLASS-128-DIG.13 ..... N83-27577*
US-PATENT-CLASS-128-660 ..... N83-27578*
US-PATENT-CLASS-128-663 ..... N83-27578*

US-PATENT-CLASS-250-282 ..... N83-27184*
US-PATENT-CLASS-250-288 ..... N83-27184*
US-PATENT-CLASS-250-423 ..... N83-27184*
US-PATENT-CLASS-323-269 ..... N83-27126*
US-PATENT-CLASS-323-303 ..... N83-27126*
US-PATENT-CLASS-323-350 ..... N83-27126*
US-PATENT-CLASS-333-22F N83-27085*
US-PATENT-CLASS-333-254 ..... N83-27085*
US-PATENT-CLASS-408-1R N83-27058*
US-PATENT-CLASS-408-61 ..... N83-27058*
US-PATENT-CLASS-409-131 ..... N83-27058*
US-PATENT-CLASS-415-115 ..... N83-27144*
US-PATENT-CLASS-416-1 ..... N83-27144*
US-PATENT-CLASS-416-97R N83-27144*
US-PATENT-CLASS-422-52 ..... N83-27569*
US-PATENT-CLASS-429-34 ..... N83-27344*
US-PATENT-CLASS-429-40 ..... N83-27344*
US-PATENT-CLASS-429-105 ..... N83-27344*
US-PATENT-CLASS-429-107 ..... N83-27344*
US-PATENT-CLASS-429-109 ..... N83-27344*
US-PATENT-CLASS-435-3 ..... N83-27569*
US-PATENT-CLASS-435-8 ..... N83-27569*
US-PATENT-CLASS-435-34 ..... N83-27569*
US-PATENT-CLASS-435-38 ..... N83-27569*
US-PATENT-CLASS-435-39 ..... N83-27569*
US-PATENT-CLASS-435-289 ..... N83-27569*
US-PATENT-CLASS-435-291 ..... N83-27569*
US-PATENT-CLASS-604-114 ..... N83-27577*
US-PATENT-CLASS-604-151 ..... N83-27577*

US-PATENT-4,382,116 ..... N83-27344*
US-PATENT-4,382,224 ..... N83-27126*
US-PATENT-4,382,239 ..... N83-27085*
US-PATENT-4,383,171 ..... N83-27184*
US-PATENT-4,383,533 ..... N83-27578*
US-PATENT-4,383,785 ..... N83-27058*
US-PATENT-4,384,578 ..... N83-27577*
US-PATENT-4,384,823 ..... N83-27144*
US-PATENT-4,385,113 ..... N83-27569*

USAAVRADCOM-TR-83-A-1 ..... N83-27148* #

USAFETAC/DS-82/054 ..... N83-27543 #

USARIEM-M-3/83 ..... N83-27581 #
USARIEM-M-6/83 ..... N83-27580 #

USARIEM-T-7/82 ..... N83-27586 #

VDI-440 ..... N83-27070 #

VIRA-83-01 ..... N83-26814* #

VPI-AERO-130 ..... N83-27033 #

VPI-E-82.30 ..... N83-27278 #

VTT-140 ..... N83-27198 #
VTT-142 ..... N83-27275 #

WES/MP/EL-TR-A-78-2-4-VOL-6 ..... N83-27479 #

WHOI-82-43 ..... N83-27562 #
WHOI-82-53 ..... N83-27559 #

WQEC/C-82-23 ..... N83-27351* #
WQEC/C-83-1 ..... N83-27352* #

WSRL-0269-TR ..... N83-27615 #

XB-0-9038-1-10 ..... N83-27385 #

Z-82-01 ..... N83-27596 #

☆U.S. GOVERNMENT PRINTING OFFICE: 1983—381-564/316

PUBLIC COLLECTIONS OF NASA DOCUMENTS

DOMESTIC

NASA distributes its technical documents and bibliographic tools to eleven special libraries located in the organizations listed below. Each library is prepared to furnish the public such services as reference assistance, interlibrary loans, photocopy service, and assistance in obtaining copies of NASA documents for retention.

CALIFORNIA
University of California, Berkeley
COLORADO
University of Colorado, Boulder
DISTRICT OF COLUMBIA
Library of Congress
GEORGIA
Georgia Institute of Technology, Atlanta
ILLINOIS
The John Crerar Library, Chicago
MASSACHUSETTS
Massachusetts Institute of Technology, Cambridge
MISSOURI
Linda Hall Library, Kansas City
NEW YORK
Columbia University, New York
OKLAHOMA
University of Oklahoma, Bizzell Library
PENNSYLVANIA
Carnegie Library of Pittsburgh
WASHINGTON
University of Washington, Seattle

NASA publications (those indicated by an '*' following the accession number) are also received by the following public and free libraries:

CALIFORNIA
Los Angeles Public Library
San Diego Public Library
COLORADO
Denver Public Library
CONNECTICUT
Hartford Public Library
MARYLAND
Enoch Pratt Free Library, Baltimore
MASSACHUSETTS
Boston Public Library
MICHIGAN
Detroit Public Library
MINNESOTA
Minneapolis Public Library and Information Center
NEW JERSEY
Trenton Public Library
NEW YORK
Brooklyn Public Library
Buffalo and Erie County Public Library
Rochester Public Library
New York Public Library
OHIO
Akron Public Library
Cincinnati and Hamilton County Public Library
Cleveland Public Library
Dayton Public Library
Toledo and Lucas County Public Library
TEXAS
Dallas Public Library
Fort Worth Public Library
WASHINGTON
Seattle Public Library
WISCONSIN
Milwaukee Public Library

An extensive collection of NASA and NASA-sponsored documents and aerospace publications available to the public for reference purposes is maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

EUROPEAN

An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. By virtue of arrangements other than with NASA, the British Library Lending Division also has available many of the non-NASA publications cited in *STAR*. European requesters may purchase facsimile copy of microfiche of NASA and NASA-sponsored documents, those identified by both the symbols '#' and '*', from: ESA - Information Retrieval Service, European Space Agency, 8-10 rue Mario-Nikis, 75738 Paris CEDEX 15, France.

National Aeronautics and
Space Administration

Washington, D.C.
20546

Official Business
Penalty for Private Use, $300

SPECIAL FOURTH CLASS MAIL
Book

Postage and Fees Paid
National Aeronautics and
Space Administration
NASA-451

U.S.MAI

7 1 STAR, 830902 S01733HU
UNIV OF MICHIGAN
HARLAN HATCHER LIBRARY
DOCUMENTS UNIT SERIALS DIV
ANN ARBOR MI 48109

ER: If Undeliverable (Section
Postal Manual) Do Not